



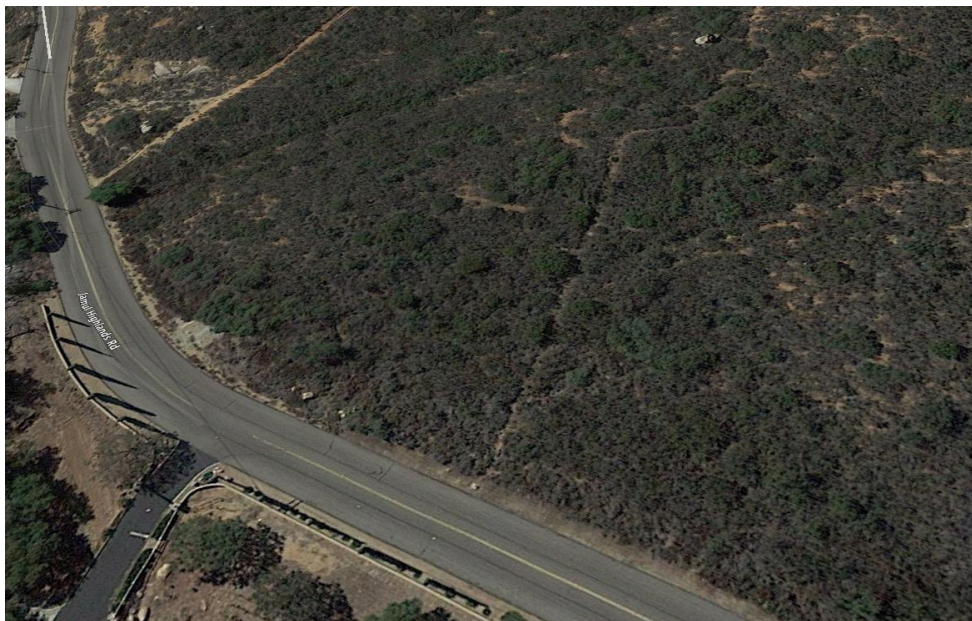
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## **TPM 21225 – ROETZHEIM PARCEL MAP**

3390 JAMUL HIGHLANDS ROAD

PDS2017-TPM-21255

August 14, 2017

APPLICANT: Lawrence & Michael Cole

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San Diego, CA 92108

***Prepared for the County of San Diego***

by

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# **CHAPTER 1**

## **INTRODUCTION**

This Fire Protection Plan (FPP) has been prepared for the TPM 21255 Lot Division Project, located on County of San Diego Assessor Parcel 596-152-04 which abuts the west side of the 3300 block of Jamul Highlands Road, Jamul, California.

The purpose of the FPP is to assess the potential impacts resulting from wildland fire hazards and identify the measures necessary to adequately mitigate those impacts.

As part of the assessment, the Plan has considered the property location, topography, geology, combustible vegetation (fuel types), climatic conditions, and fire protection systems and equipment, impacts to existing emergency services, defensible space and vegetation management.

The plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends methods of treatments that will protect one or more at-risk communities and essential infrastructures. The Plan recommends measures that property owners will take to reduce the probability of ignition of structures in the Project Area addressed by the Plan.

### **1.1 Project Location, Description and Environmental Setting**

#### **1.1.1 Project Location**

The proposed project site is within the unincorporated community of Jamul, approximately 24.5 miles east of the Pacific Ocean and eleven miles north of the United States – Mexico border. Jamul is primarily a semi-rural and rural community with an estimated population of 6200 people. It has approximately 1974 housing units of different sizes and configurations.

The Project site was located on the west side of Jamul Highlands Road, approximately 1100 feet south of the intersection of Jamul Highlands Road and Lyons Valley Road. The Project site is situated on a mildly to moderately steep east aspect hillside that exhibits evidence of preparatory grading of a roadway and building pads. The hillside outside of the disturbed area is covered with native shrub and chaparral type fuels with an average height of eight (8') feet. The vegetative fuel bed has unbroken fuel canopy continuity and compactness.



*Entrance to Project Site, West Side of Jamul Highlands Road*

### **1.1.2 Project Description**

The Project Site is located on County Assessor Parcel Number 596-152-04, with 10.31 acres of undeveloped land.

The Project proposes to divide the common parcel into four separate parcels as follows:

- Parcel 1 – this is an existing 3.075-acre parcel proposed for a single family dwelling and has two 10,000-gallon water tanks near its northwest corner
- Parcel 2 - this is an undeveloped 3.025-acre parcel which will subdivided from the main existing parcel
- Parcel 3 – this is an undeveloped 2.0-acre parcel which will be subdivided from the main existing parcel
- Parcel 4 – this is an undeveloped 2.433-acre parcel which will be subdivided from the main existing parcel.

Parcel 1 is at the northwest corner of the Project Site and has a semi-flag shaped configuration beginning at the western property line. The parcel extends in an easterly direction past the proposed private road cul-de-sac bulb to the midpoint of the existing parcel.

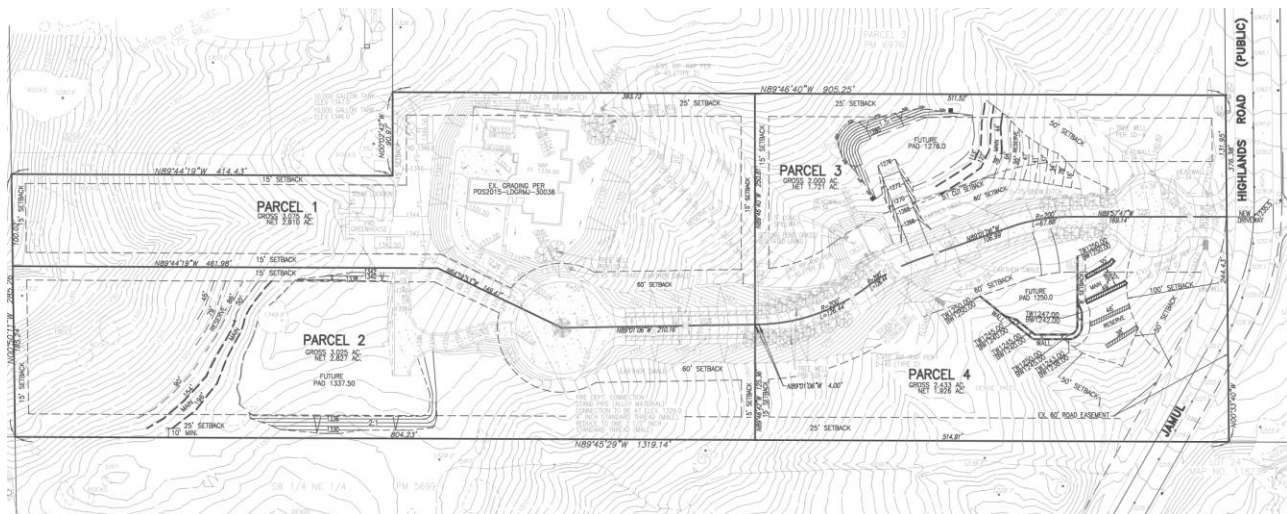
Parcel 2 is immediately south of Parcel 1 and extends in a west-to-east configuration to the mid-point division line of the existing parcel.



Parcel 3 is at the northeast corner of the Project Site, and extends in a west-to-east configuration from its shared property line with Parcel 1 to the western right-of-way edge for Jamul Highlands Road.

Parcel 4 is at the southeast corner of the Project Site, and extends in a west-to-east configuration from its shared property line with Parcel 2 to the western right-of-way edge for Jamul Highlands Road.

The existing Parcel 1 and proposed Parcels 2-4 share a west-to-east configured property line that transects the center line of the proposed private roadway at the center of the development.



*Proposed Development of TPM 21255 Project Site*

#### **1.1.2.1 Proposed Project Use**

The project proposes to sub-divide an existing 10.31-acre parcel into four residential lots for single family dwellings.

#### **1.1.2.2 Open Space and Riparian Areas**

Evaluation of the physical Project Site, available document and maps does not reveal the presence or establishment of Open Space, Riparian and Wetlands Areas on or adjacent to the Project Site.

#### **1.1.2.4 – Off-Site Improvements**

##### **1.1.2.4.1 – Roads**

The Project Site is initially accessed from Lyons Valley Road, a public street that begins at its intersection with State Route Highway 94, approximately two miles southwest of the Project. Lyons Valley Road has varying curb-to-curb widths, varying between twenty-four (24') to forty (40') feet, depending on the age of the roadway and previous

mitigations for both residential and commercial development along its general south to northeasterly pathway through the community and undeveloped lands. Lyons Valley Road is approximately 1100 feet north of the Project Site.

Jamul Highlands Road is a public street that begins at its intersection with Lyons Valley Road and has a general north-to-south configuration. Between the intersection with Lyons Valley Road and the Project Site entrance, Jamul Highlands Road has a measured curb-to-curb paved width of forty (40') feet. The roadway has an all-weather surface paved with asphaltic concrete that appears to be in relatively good condition with minimal wear cracks in its surface.



***Jamul Highlands Road Looking South, Project Site on West Side of Road***

The Project Site has an established graded roadway right-of-way extending approximately 781 feet from the western edge of the Jamul Highlands Road right-of-way shoulder to the top of the hillside within the development borders. The roadway has an improved curb to curb width of twenty-six (26') feet, with a proposed paved width of twenty-four (24') feet. Curbs and gutters are intended to be installed on the remaining two (2') feet of improved graded width. Gradients for the roadway range between 0% to 19.4% at the top of the grade. Mid-slope gradient for the graded road is approximately 14.7%. There is a graded 93-foot diameter cul-de-sac bulb at the western terminus of the proposed road. Roadway improvements were performed by permission of a County of San Diego grading permit, number PDS-2015 LDGR MJ-30036, issued on March 27, 2017.



***Existing Project Site Preliminary Graded Road Installation***



***Grading Permit Issued for Road and Pad Grading on Project Site***

#### **1.1.2.4.2 – Utilities**

##### **Fuel Gases**

The Project, when developed, will be serviced private entity LP gas vendors and suppliers.

##### **Electrical Utility**

The Project Site's electrical utilities will be served by Sempra Energy-SDGE.

##### **Water Utilities**

The Project Site is within the jurisdictional boundaries of the Otay Municipal Water District.

##### **Telephonic Utilities**

Telephone utilities on the Project Site will be provided as determined by individual property owner selection.

#### **1.1.3 Environmental Setting**

##### **1.1.3.1 Dates of Site Inspections/Visits**

The Project Site was visited by the Fire Protection Consultant to evaluate on- and off-site conditions, analyze anticipate fire behavior and verify fire department travel times on the following dates:

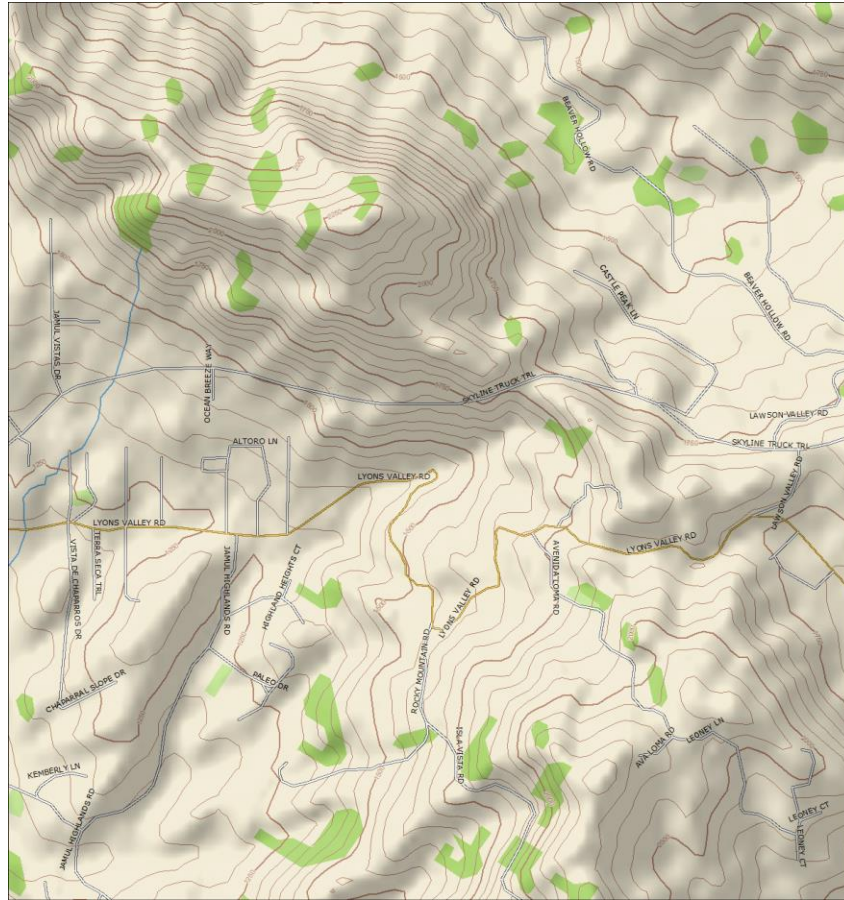
- Initial Site Visit – August 13, 2017
- September 9, 2017

##### **1.1.3.2 Topography**

The project site is situated on a mild to moderately steep east aspect hillside on the west side of the Jamul Highlands Road right-of-way. The land is relatively flat immediately adjacent to the roadway, with slopes beginning to transition uphill approximately thirty (30') feet west of the curb line. The average slope for the undeveloped parcel is approximately 14.7%, with an elevation increase of 107 feet over a distance of approximately 760 feet.

The general land mass adjacent to the Project Site and Jamul Highlands Road is a wide canyon, with moderately steep sides with a north-to-south configuration over a distance of approximately 1.5 miles.





***Topographic Map of Project Site and Surrounding Area***

### **1.1.3.3 Vegetation**

Vegetation on the Project Site is a mixture of Southern California Chaparral shrub and brush types.

The vegetative fuels have uninterrupted continuity and fuel heights exceeding seven (7') feet over extended areas of the Site. The estimated fuel age is five (5) to plus (40+) years. A large amount of the vegetation appears to be in a decadent state, with a high dead-to-live fuel ratio.



***Typical Fuel Types and Load on the Project Site***

The initial site visit determined that the native vegetative fuels on the site can be classified as SH-7, Very High Load, Dry Climate Shrub according to the most current edition of *Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model*.

### **Shrub Fuel Type Models (SH)**

The primary carrier of fire in the SH fuel models is live and dead shrub twigs and foliage, in combination with dead and down shrub litter. A small amount of herbaceous fuel may be present, especially in SH1 and SH9, which are dynamic models (their live herbaceous fuel load shifts from live to dead as a function of live herbaceous moisture content). The effect of live herbaceous moisture content on spread rate and flame length can be strong in those dynamic SH models.

### **SH-7, Very Heavy Load, Dry Climate Shrub**



*Typical SH-7 Very Heavy Load Dry Climate Shrub Growth on Project Site*

The primary carrier of fire in SH7 is woody shrubs and shrub litter. The vegetative fuel has very heavy shrub loading, with a depth of four (4 to 6') to six feet. The Rate of Spread, while considered high, is lower than SH-5 fuels, but the flame lengths are similar and usually very high. Fuel loading is 6.9 tons per acre and the extinction moisture content is low at 15%.

#### **1.1.3.4 Fire History**

According to the documentation available to the Consultant, the last fire event that impacted the Project site was the Laguna Fire. The Laguna Fire started near Pine Valley in September 1970 during a Santa Ana wind event and burned 180,000 acres, moving in a west to southwest direction. The entire Project site was burned over during this fire.

The Project site was not impacted by the 2007 Harris Fire. Fire perimeter mapping indicates that the Harris Fire did not reach the Project site, with the perimeter held to an area approximately one to two miles south of the property.

#### **1.1.3.5 Climate**

Like most of Southern California, San Diego County and the project site has a Mediterranean Climate typified by warm to hot dry summers and mild to cool winters. Summer temperatures range between the mid-nineties and low one hundreds during the summer and fall months with occasional extraordinarily hot, dry spells similar to



desert conditions occurring. Rainfall averages nine to fifteen inches at the lower elevations where the project site is located. Santa Ana winds are one of the most notable weather conditions in Southern California and San Diego County. Typically, these dry winds occur during the late summer and fall months (September through November) but may happen at any time during the year. With combined adiabatic (compression) heating (for every 1000 feet of elevation decline, temperature increases five degrees) and wind velocities exceeding 40 miles per hour, Santa Ana winds severely exacerbate wildfires, especially during drought conditions.

The U.S. Forest Service Weather Information Management System provides information about weather patterns in San Diego County. Daily afternoon weather observations in San Diego County were analyzed for forty-four years (1961-2005) at selected fire stations. San Diego County is divided into five climate zones between the coast and desert. Weather data between April and December are used to represent the annual fire season in San Diego County, with the most severe fire weather conditions in September and October. The following table was derived by the analysis of San Diego County's Interior Climate Zone where the project is located.

#### **Worst Case Weather and Burning Conditions, Interior Zone**

<b>Period</b>	<b>Temperature</b>	<b>Humidity</b>	<b>Wind Speed</b>	<b>Burning Index</b>
Summer	90-109	5-9%	18 mph	153
Santa Ana	90-109	5-9%	24 mph	168
Peak	90-109	5-9%	56 mph	-

#### **1.1.3.6 Land Ownership and Existing Land Uses**

The Project site is currently owned by the William and Marianne Revocable Trust, William Roetzheim, Jamul, CA. 91935.

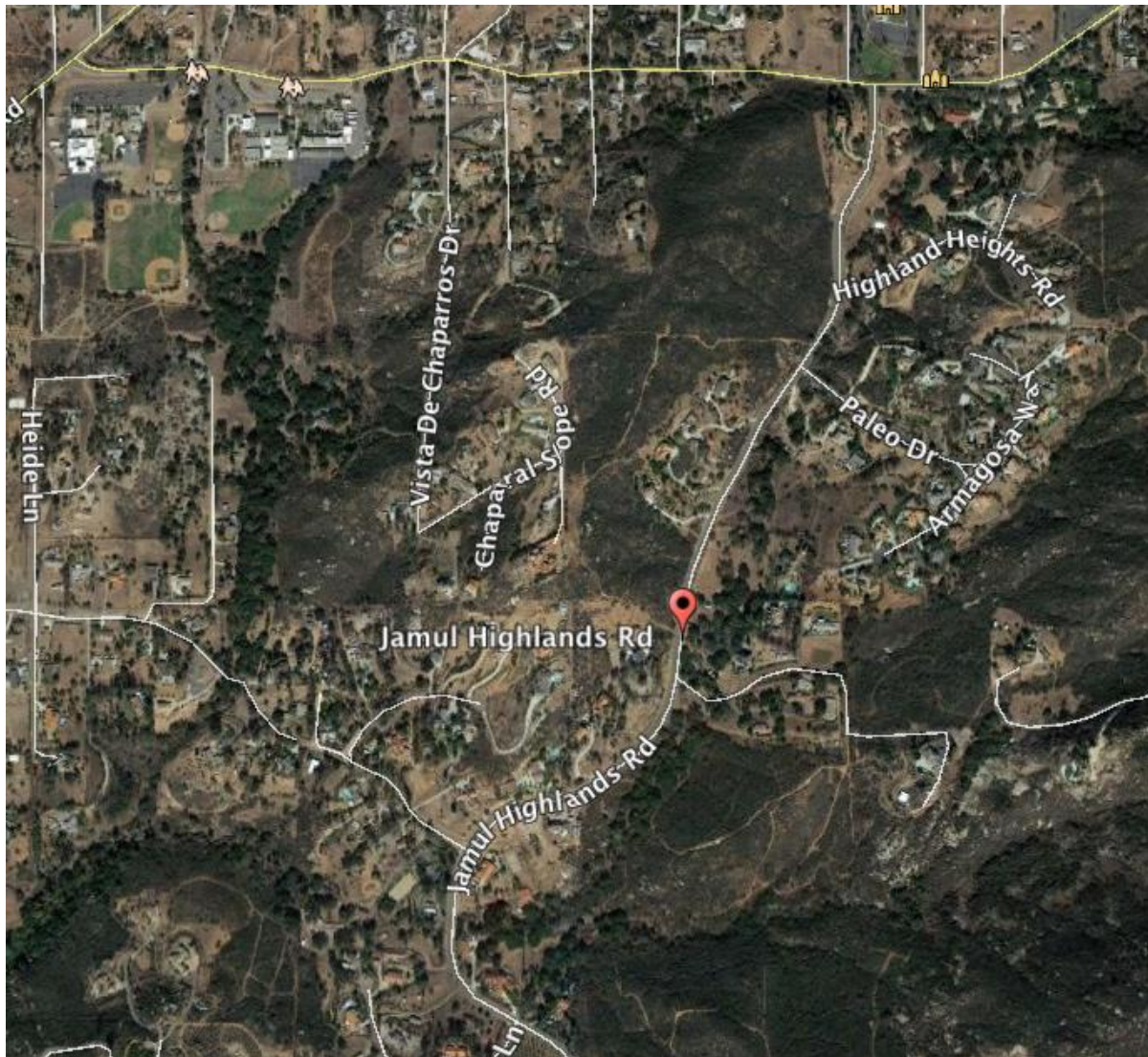
All lands surrounding the Project site are essentially medium to large acreage single family residences owned by individual private owners.

Analysis of aerial photography of the Jamul Highlands Road vicinity indicates that a large number of single family dwellings, either individually or as subdivided land projects, have been permitted to be constructed in this area. The majority of these homes and developments are parallel to, or significantly south of, the proposed Project Site.

TPM-21255 Project is being tasked by the County of San Diego to provide special mitigations for over-length roadways leading to and from its Project Site.

**Finding:** Analysis of the aerial photography and site visits indicate that off-site development of single family dwellings in this area are **not** in compliance with standard fire protection and prevention measures required for buildings on over-length roadways.





*Aerial View of Existing Jamul Highlands Road Single Family Dwelling Development*

## **CHAPTER 2 GUIDELINES FOR THE DETERMINATION OF SIGNIFICANCE**

### **2.1 Emergency Services – Availability and Travel Time**

#### **2.1.1 Emergency Services Availability**

The Project is within the Sphere of Influence and jurisdictional boundaries of the San Diego County Fire Authority.

The Fire Authority is an “all risk” agency providing 24-7-365 fire protection services to an area of approximately 720 square miles and 26,500 residents.

The Authority has 14 stations and is a combination paid and volunteer public agency. The District has an Insurance Services Office (ISO) Fire Protection rating of five (5) and nine (9). The District works closely with the CALFIRE, United States Forest Service, United States Fish and Wildlife Service, US Bureau of Land Management, and California Fish and Game Department, It has automatic and mutual aid agreements with fire agencies bordering the District.

The closest paid-staff District facility is Fire Station 36, the District Headquarters, which is located at 14024 Peaceful Valley Ranch Road. This station is staffed twenty-four (24) hours per day with career firefighters and is approximately 4.3 miles from the Project site.

## 2.1.2 – Travel Times

Using the NFPA 1142 response time formula, assuming a constant 35 miles per hour travel speed, the County of San Diego estimates a response time for fire apparatus driving from Station 36 to the project site is approximately eight minutes.

Table 5-1, Travel Time Standards, from the County of San Diego General Plan’s Safety Element indicates that a maximum response time of ten (10) minutes is allowed for Single Family Dwellings in Land Use Designations SR-1, Semi-Rural Residential Areas.

The estimated response travel time from Station 36 to the Project site is approximately eight (8) minutes. The County of San Diego General Plan specifies a maximum response time of ten (10) minutes for Semi-Rural Zoning. The project complies with the General Plan emergency response time criteria.

Table S-1 Travel Time Standards from the Closest Fire Station*		
Travel Time	Regional Category (and/or Land Use Designation)	Rationale for Travel Time Standards**
5 min	<ul style="list-style-type: none"> <li>Village (VR-2 to VR-30) and limited Semi-Rural Residential Areas (SR-0.5 and SR-1)</li> <li>Commercial and Industrial Designations in the Village Regional Category</li> <li>Development located within a Village Boundary</li> </ul>	In general, this travel time standard applies to the County's more intensely developed areas, where resident and business expectations for service are the highest.
10 min	<ul style="list-style-type: none"> <li>Semi-Rural Residential Areas (&gt; SR-1 and SR-2 and SR-4)</li> <li>Commercial and Industrial Designations in the Semi-Rural Regional Category</li> <li>Development located within a Rural Village Boundary</li> </ul>	In general, this travel time provides a moderate level of service in areas where lower-density development, longer access routes and longer distances make it difficult to achieve shorter travel times.
20 min	<ul style="list-style-type: none"> <li>Limited Semi-Rural Residential areas (&gt;SR-4, SR-10) and Rural Lands (RL-20)</li> <li>All Commercial and Industrial Designations in the Rural Lands Regional Category</li> </ul>	In general, this travel time is appropriate for very low-density residential areas, where full-time fire service is limited and where long access routes make it impossible to achieve shorter travel times.

**Finding:** The San Diego County Fire Authority's Form PDS-399-F *Project Facility Availability – Fire* form, shows the Project site has a response distance from Station 36 of 4 miles, with a response time of 7.45 minutes.

**Finding:** The Project is in compliance with the General Plan's Emergency Response Time criteria.

Additional paid and volunteer staffed District Fire Stations are located near the Project site:

- Station 34 – Lee Valley Station 15781 Lyons Valley Road – 3 miles from the Project site, with a driving time of seven (7) minutes.
- Station 33 – Lawson Valley Station, 3890 Montiel Truck Trail, seven (7) miles from the Project site, with a driving time of approximately seventeen (17) minutes.
- CAL-FIRE staffs the Lyons Forest Fire Station, located at 17759 Skyline Truck Trail, which is 6.71 miles from the Project Site. The estimated driving time is nine (9) minutes.

### **2.1.3 – Vegetation Fire Response Dispatch Patterns**

The Project Site is located in lands designated by the CAL-FIRE Fire and Resource Assessment Program as a Very High Fire Severity Area (VHSFA). It is also in lands designated as State Responsibility Area (SRA), in which CAL-FIRE has primary responsibility for suppressing wild fire incidents.

#### **CAL-FIRE Vegetation Fire Responses**

Low Wildland – Two (2) Type III engines, one (1) Battalion Chief

Medium Wildland – Four (4) Type III engines, one (1) BC, one (1) bulldozer, two (2) hand crews, two (2) helicopters, one (1) air attack, two (2) air tankers

High Wildland – six (6) Type III engines, one (1) BC, two (2) dozers, four (4) hand crews, three (3) helicopters, one (1) air attack, three (3) air tankers

**NOTE:** These are basic response levels. Response levels are subject to change based on anticipated weather and fire behavior conditions, staffing patterns for unusual events, and State-wide resource commitments.

### **2.2 Emergency Access and Evacuation**

#### **Evacuation Routes from Project Site:**

Residents of the proposed project site have several evacuation options in the event of wildfires or other emergencies.

Residents will initially egress the project site from its private roadway by turning left (north) on Jamul Highlands Road. They will proceed in a northerly direction to Lyons Valley Road, a distance of approximately 1100 feet.

Lyons Valley Road is the primary paved public street serving the area of the proposed project site. Lyons Valley Road has an improved paved width of twenty-two (22') feet near the Project Site and has a west to east configuration. Traveling west-bound on Lyons Valley Road, the improved paved width of the road surface significantly increases.

At the intersection of Lyons Valley Road, residents will have two directions of travel for evacuation routes.

### **Evacuation Route Options to the West**

Turning west (left) residents have the option of proceeding toward the intersection of Lyons Valley Road and Highway 94 which is approximately two miles from the Project Site.

At the intersection, residents can turn northeast (right) and travel on Skyline Truck Trail to a second intersection with Lyons Valley Road, approximately six miles east of the Project Site. They will travel an additional seven miles to Japatul Valley Road. At this intersection, two directional travel options are provided, one (turning left to the west) leading to the community of Alpine and the other (turning right) leading to the intersection of State Route (Highway) 79 and Interstate 8 near the community of Descanso.

At the intersection of SR-94, residents will turn right (west) and proceed either into the Jamul community center or continue west to the communities of Rancho San Diego, Spring Valley, La Mesa or El Cajon.

### **Access to Evacuation Centers**

Turning west (left) on Lyons Valley Road, residents can travel approximately one-half mile to the Jamul Primary and Intermediate Elementary School complexes, which can serve as a temporary evacuation center or community safety area in the event of fires or other disasters.





***Jamul Primary & Intermediate School Complex, Lyons Valley Road***

***Finding:*** Information derived from the 2006 Jamul Disaster Plan verifies that the school complexes are designated Evacuation and Community Safety Centers for the area.

Turning east on Lyons Valley Road, residents can travel approximately one block and enter the grounds of the Church of the Later Day Saints grounds, which can also serve as a temporary evacuation center or community safety area in the event of fires or other disasters.









*Existing Fire Hydrant North of Project Entry Road*



The Consultant's site visit revealed that two 10,000-gallon water storage tanks have been installed on existing Parcel # 1.

Two 10,000-gallon water tanks have been installed on the upper pad graded on Parcel # 1. These tanks have been required as combination fire and domestic water storage for the Project site.



*10,000 Gallon Water Tanks on Parcel # 1*

## **2.4 - Fire Sprinkler Systems**

There are no existing buildings on the Project Site.

All new and future buildings will have automatic fire sprinkler systems compliant with NFPA Pamphlet 13-D for residential fire sprinklers in one and two family dwellings installed as required by the most current edition of the San Diego County Consolidated Fire Code.

## **2.5 - Ignition Resistant Construction**

There are no existing buildings or structures on the proposed Project Site. All new and future buildings and structures will be required to conform to Chapter 7-A of the County of San Diego Building Code for Ignition Resistant Building Construction Standards for Wildland-Urban Interface Areas.

## **2.6 Defensible Space, Ornamental Landscaping and Vegetation Management**



There are no existing structures and buildings on the proposed Project Site.

Defensible Space, Vegetation Management and Ornamental Landscaping are regulated by provisions found in the County of San Diego Consolidated Fire Code, California Fire Code, International Wildland Urban Interface Code, California Public Resources Code, California Health and Safety Code and the California Government Code. Buildings and structures erected in brush covered lands are generally required to have defensible space and fuel modification zones measuring 100 feet in depth.

All regulatory provisions contain Exception clauses *allowing* diminished defensible space depth when sufficient clearance cannot be accomplished because of parcel constraints and restrictions. In such cases, defensible space is provided as “Zone 1” (removal of all native vegetation with replacement consisting of fire- and/or drought-resistant species and “approved”, irrigated landscaping) fuel modification zones that extend to established property lines.

Recent State legislation limits extension of fuel modifications beyond a 100-foot deep defensible space for properties in extra hazardous locations. This is only allowed after an evaluation by CAL-FIRE (or Local Fire Authority Fire) Prevention personnel and with production of a written justification by the inspecting agency. Property owners *cannot* be required to provide *off-site* fuel modification zones and defensible space *beyond* their property lines.

## **CHAPTER 3**

### **ANTICIPATED FIRE BEHAVIOR IN THE VICINITY**

#### **3.1 Fire Behavior Model**

##### **3.1.1 Summary Narrative**

Anticipated Fire Behavior was analyzed after visiting the Project and identifying the on- and off-site natural vegetative fuels. Terrain and topographical inputs were determined by site visits and making comparisons with two- and three-dimensional maps. Weather inputs were derived from the Interior Zone Worst Case Weather and Burning Conditions table supplied by the County of San Diego Guidelines for Fire Protection Plans and by 2003 Cedar Fire weather and fuel parameters, which are currently established as worst-case fire behavior conditions in San Diego County.

The above data inputs were subjected to analysis by the BEHAVE-Plus 5.0.5 Wildland Fire Modeling program to determine potential wild fire behavior at the Project Site.

The BEHAVE-Plus Fire Behavior Prediction and Fuel Modeling System is a computer-based systematic method of predicting wild land fire behavior. It was developed by the U.S. Forest Service at the Intermountain Forest Fire Laboratory, Missoula, Montana, and is used by wild land fire experts and scientists nationwide. BEHAVE-Plus is

designed to predict fire spread and describes fire behavior only at the flame front of a fire. The primary parameter of the BEHAVE fire behavior calculations are dead fuels less than one-quarter (1/4") inch in diameter that readily carry fire across the landscape. Fuels larger than three (3) inches in diameter are not included in the BEHAVE calculations. The BEHAVE fire model describes a wildfire spreading through surface fuels, which are the burnable materials within six (6) feet of the ground and contiguous to the ground.

### 3.1.2 Use of Fire Model Inputs – Caveat

The BEHAVE-Plus Fire Behavior Model is a tool used by fire authorities to estimate the behavior of fire moving towards a structure under certain assumptions. The Fire Behavior Model is only an estimate and is not designed to replace the experience of the local Fire Authority, who is familiar with local wildfire behavior. The Behave-Plus fire model is not the only recognized fire model that is available; it is identified in this report only because it is the model currently used by most fire consultants.

### 3.1.3 Vegetation Fuel Models

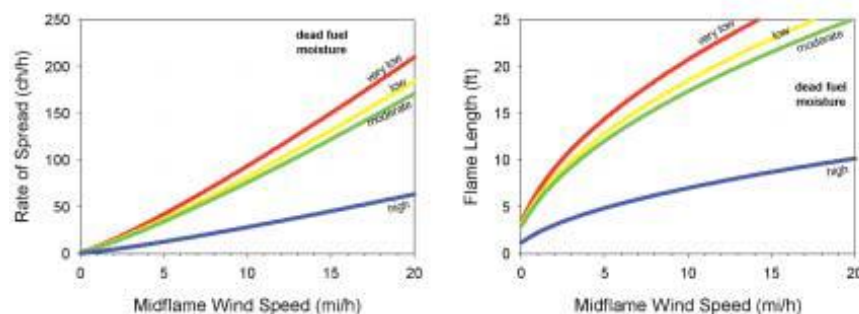
Vegetation on the Project Site is a mixture of Southern California Chaparral shrub and brush types.

The majority of the vegetation on- and off-site at the Project Site can be categorized as SH-7, Very High Load, Dry Climate Shrub.

The primary carrier of fire in SH7 is woody shrubs and shrub litter. SH-7 fuels have a very heavy shrub load with a depth of four to six feet. The spread rate is lower than Fuel Model SH-5, Moderate Load Dry Climate Shrub, but flame lengths are similar.

General characteristics of SH-7 vegetation include:

High Rates of Spread and very high flame lengths  
Fine fuel load 6.9 tons per acre  
Extinction moisture content - 15%



### **3.1.4 BEHAVE Fire Modeling Outputs**

Under worst-case Cedar Fire weather and fuel parameters, Fuel Model SH-7 will produce flame lengths that are 37.5 feet long, an average rate of spread of 305 feet per minute. The fire is capable of releasing ember showers that will start 100% suppressible fires at distances of 1.5 miles in receptive vegetative fuels downwind of the main fire front. (*See Appendix F*)

### **3.2 Anticipated Fire Behavior**

Evaluation of anticipated fire behavior on the Project site used historical data, analysis of significant wind events and identifying the different fuel models present in the area.

The strongest winds likely to impact the Project are from the east/northeast during Santa Ana wind events. The Project site has moderately steep east-facing slopes with topography and vegetative fuels that are in direct alignment and influences of strong northeast wind conditions. This can create significant impacts on fire spread and behavior.

The normal south and southwest winds typically associated with the area are occasionally strong and gusty. However, these normal winds are generally associated with cooler, moist air and usually have a higher relative humidity of 40% or more. They are considered a serious wildfire weather condition when wind speeds are over 20-MPH and relative humidity is 30% or lower.

The project site is located at and below a ridge line that would partially shelter vegetative fuels from southwest wind effects on fire behavior, resulting in moderate impacts on fire spread and behavior. The ridge line will, however, be subject to potentially moderate wind eddies from collision of the southwest wind and solar radiation topographical wind updrafts moving uphill from the east facing slope.

The Project is currently covered by vegetation typical of Fuel SH-7, Very Heavy Load Dry Climate Shrub. The chaparral and shrub fuels consistent with Fuel Model SH-7 are, according to BEHAVE computer fire modeling, the most severe fire behavior conditions measured for the project site. For the overall analysis of fire behavior, all fire scenarios will use fuel models SH-7 to predict fire behavior under various conditions and locations on the Project Site.

### **Fire Behavior Threat Analysis**

An evaluation of the Project Site was has determined that it will be exposed to the following foreseeable wild fire threats as listed below. The predicted fire behavior is the worst-case scenario anticipated for the environmental and weather parameters of the Project site.

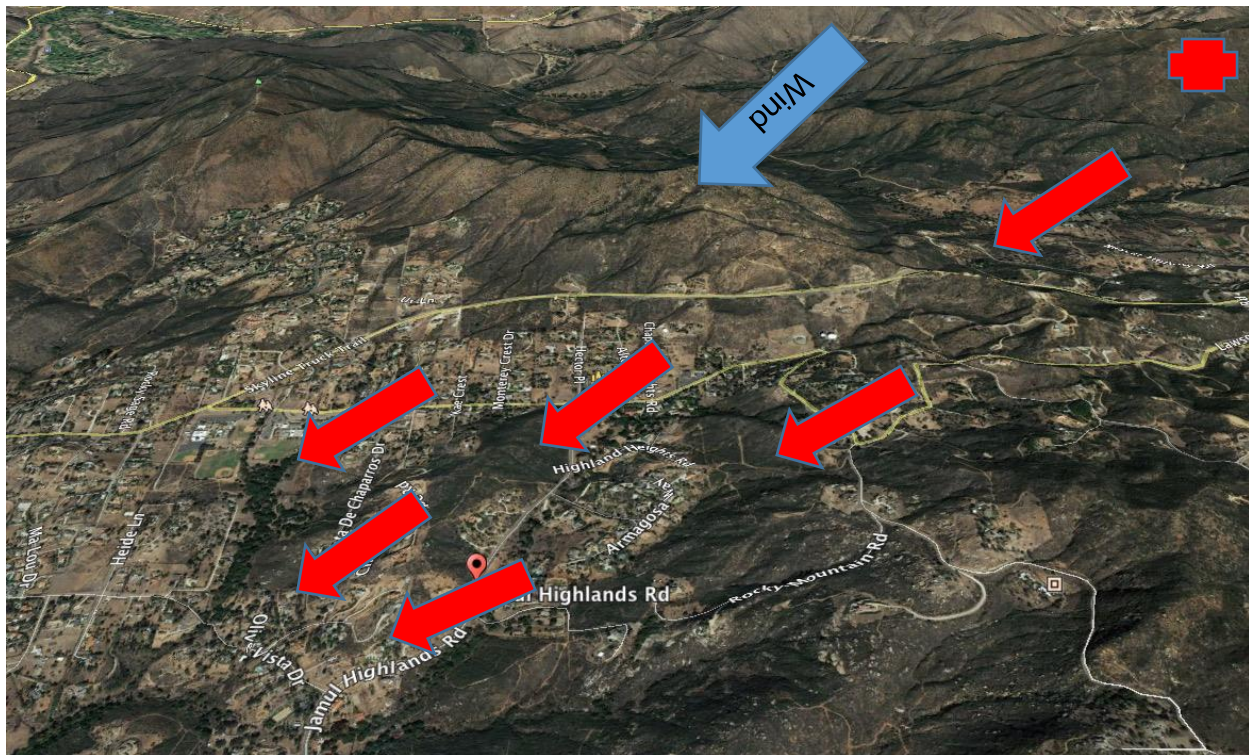
Location	Flame Length	Rate of Spread	Spotting
North and South Sides of Project Site	37.5 feet	305 feet/minute	1.5 miles, 100% ignition rate

**Table 3.2.1 - Worst Case Fuel Model SH-7 Predicted Fire Behavior**

The fire behavior analysis scenarios listed below are for existing, pre-Project completion conditions only. Development of the Project Site will change anticipated fire behavior and will be addressed in Section 4.7.1.1.

### 3.2.1 Northeast-Santa Ana Wind Event (Worst Case)

For purposes of worst-case fire behavior analysis, an off-site wind-driven fire approaches the Project Site from the area of Sycuan Peak (indicated by RED cross), located approximately three (3) miles northeast of Jamul Highlands Road.



**Anticipated Fire Behavior for Northeast-Santa Ana Wind Events**

Santa Ana Northeast winds, with velocities of 30 mph, or more, will influence the fire's head (leading edge of the flame front) and drive the fire across the landscape in a southwesterly direction with a high rate of flame spread. Rate of spread, based on wind speed, topography and vegetative fuel types is anticipated to be 305 feet per minute.

The flame front will move through existing developed residential areas before reaching the Project site. It is foreseeable that one, if not several residential buildings, depending on building construction, fire intensity and condition of fuel modification zones (defensible space) around buildings, will ignite with the flame front passage.



While moving through the developed off-site housing sites, the flame front will cause the release of aerial fire brands, which can travel a considerable distance ahead of the main body of fire and ignite susceptible vegetative fuel beds. For purposes of this analysis, firebrands are deposited in the unmanaged fuel bed on the Project site's eastern slope and west of Jamul Highlands Road. Natural vegetation in this area are heavy chaparral fuel types with heavy canopy loading and unbroken continuity and compactness. Fuel height varies between six (6') and three and approximately thirteen (13') feet, with the average being eight (8') to ten (10') feet.



The vegetation in this area can be described as Fuel Model SH-7, Very High Load Dry Climate Shrub. Fires in this fuel bed will produce flame lengths of approximately 37-1/2 feet, will progress across the landscape at an average rate of 305 feet per minute and will loft fire brands 1.6 miles with 100% ignition in downwind receptive fuel beds.

Under the influence of northeast Santa Ana winds, the flame front will progress rapidly upslope, and downslope on the back side of the ridgeline on the west side of the Project Site, in a southwesterly direction. Fire behavior may be unpredictable due to gusty winds; erratic winds; wind eddies on ridgelines; long-range spotting with firebrands deposited in receptive vegetation downwind for distances over 1.5 miles; and rapid fire extension downslope into any natural chimneys present in the landscape. Natural topographic features associated with the development of fire whirls are present along the prominent ridge lines and natural drainages with prominent peaks.

The flame front can be expected to follow the hillside slopes and drainage under the influence of the northeast winds, with rapid rates of spread. The flame front will create potential direct flame contact, convective and radiant heat exposures to any buildings and structures along the path of its spread across the landscape. Firebrands lofted by convective air currents will land in vegetation islands between homes west and southwest of the Project, igniting receptive and unmanaged vegetation, and potentially, non-fire resistive buildings and structures.

### **3.2.2 Typical Southwest Wind Conditions**

For purposes of fire behavior analysis, for worst-case situation, a fire will start off-site in the backyard southwest of the Project Site on Chaparral Slope Road (indicated by RED cross).



*Vegetation Present on Lots 1 & 2, Looking East from Jamul Elementary School  
Project Site Water Tanks Visible on Ridgeline (Yellow Arrow)*

Strong prevailing late afternoon winds from the southwest can pose a threat to the Project Site. These winds will direct a fire front through the unmanaged vegetative fuels (Fuel Model SH-5) on the back slope of the hillside west of the Project Site to the ridgeline at the western property line of the Project Site.



In this scenario, predicted flame lengths with a 30 MPH southwest wind has predicted flame lengths of approximately 37.5 feet. Fire behavior will progress cross- and up-slope corresponding to daily convective wind patterns resulting from solar radiation and increases in atmospheric temperatures.



When the fire front leaves the residential yard of origin, fire behavior will change significantly. Under continuing upslope wind influences, the flame front will progress rapidly up- and cross-slope in northeasterly and easterly directions. Fire behavior may be unpredictable due to gusty winds; erratic winds; wind eddies on ridgelines; long-range spotting with firebrands deposited in receptive vegetation downwind for distances over 1.5 miles; and rapid fire extension upslope in any natural chimneys present in the landscape.

Unstable, erratic winds, in combination with and unevenly heated ground, could trigger fire whirls at the ridge, resulting in unpredictable rates of spread and intensity.

The flame front is expected to crest and roll over the top of the ridgeline, extending onto the eastern slope. Fire spread may initially diminish under influence of conflicting southwesterly upslope winds and solar radiation convective winds on the back side of the slope facing Jamul Highlands Road. There will be wind eddies at the ridgeline, resulting in erratic horizontal cyclonic wind forces that encourage erratic fire behavior. Deposits of fire brands on the back side of the slope will cause fresh fire starts that will follow solar convective wind currents back to the west but underneath the shelter of the predominant southwest wind. Fires further down slope on the east-facing slope will be influenced by surfacing southwestern winds and begin progressing across the landscape in a northeastern and eastern direction. The flame front may will create potential direct flame contact, convective and radiant heat exposures to all buildings and structures along the path of its spread across the landscape, especially to the north and on the east side of



Jamul Highlands Road. Firebrands lofted by convection will land in the vegetation islands between homes, igniting receptive and unmanaged vegetation.



This FPP will prescribe implementation of the current Fire Code requirements that should mitigate fire risks from either a 60-mph northeast Santa Ana wind or any prevailing 30-mph southwest or south wind.

### **3.2.3 Fuel Modified Project Site Fire Behavior**

Anticipated fire behavior analysis for the fuel modified Project Site is discussed in Section 4.5.1.

## **CHAPTER 4 ANALYSIS OF PROJECT EFFECTS**

### **4.1 Adequate Emergency Services**

#### **4.1.1 – Fire Authority Having Jurisdiction**

The Project is within the Sphere of Influence and jurisdictional boundaries of the San Diego County Fire Authority.

The Fire Authority is an “all risk” agency providing 24-7-365 fire protection services to an area of approximately 720 square miles and 26,500 residents.

The closest paid-staff District facility is Fire Station 36, the District Headquarters, which is located at 14024 Peaceful Valley Ranch Road. This station is staffed twenty-four (24) hours per day with career firefighters and is approximately 4.3 miles from the Project site.

#### **4.1.2 – Response Time and Nearest Fire Station**

Using the NFPA 1142 response time formula, assuming a constant 35 miles per hour travel speed, the County of San Diego estimates a response time for fire apparatus driving from Station 36 to the project site is approximately eight minutes.

Table 5-1, Travel Time Standards, from the County of San Diego General Plan's Safety Element indicates that a maximum response time of ten (10) minutes is allowed for Single Family Dwellings in Land Use Designations SR-1, Semi-Rural Residential Areas.

The estimated response travel time from Station 36 to the Project site is approximately eight (8) minutes. The County of San Diego General Plan specifies a maximum response time of ten (10) minutes for Semi-Rural Zoning. The project complies with the General Plan emergency response time criteria.

#### **4.2 Fire Access**

##### **4.2.1 - Access to Project Site**

The Project Site currently has one major ingress and egress route.

Emergency vehicles access the Project Site by proceeding toward the area along Lyons Valley Road. Lyons Valley Road is a public road, with an asphaltic concrete driving surface that appears relatively well maintained and has varying paved widths ranging from twenty-four (24') to forty (40') feet. The right-of-way has a configuration with combined straightaways and curves with variable up and downhill grades. Upon arriving at the intersection of Lyons Valley Road and Jamul Highlands Road, fire apparatus will turn south onto Jamul Highlands Road.

Jamul Highlands Road is a public street with an asphaltic concrete driving surface that appears relatively well maintained. The paved width of Jamul Highlands Road is forty (40') feet curb-to-curb as measured between paved berms.

Apparatus will proceed south on Jamul Highlands Road to the intersection of the proposed private road that serves the Project site.



Immediate access to the Project Site is on the proposed private roadway. The private roadway had already been graded over the Project Site topography on the first site analysis visit by the Fire Consultant. The private road corridor has a graded twenty-six (26') foot width, with a proposed paved width of twenty-four (24') feet. The graded road has a length of approximately 750 feet from the intersection with Jamul Highlands Road to the terminus of the cul de sac at its western end.



*Graded Private Road, Looking West from Jamul Highlands Road*



The lower (eastern) portions of the road are relatively flat at the intersection with Jamul Highlands Road. The grade remains fairly flat as distance from Jamul Highland Road increases. There is an initial gradual change in gradient that becomes more moderate as the “ess” (S) curve at the center of the road’s length is approached. Maximum road gradient of 19.4% is achieved just east of the plateau upon which the terminal cul-de-sac has been placed.



*Cul de Sac at Eastern End of Private Road, Looking East from Parcel #2*

#### **4.2.2 – Current Road Conditions**

Jamul Highlands Road, a public road, is immediately adjacent to the eastern property line of the Project Site. It begins at its intersection with Lyons Valley Road and has a north to south configuration for an approximate length of 1.25 miles. The right-of-way corridor has a curb-to-curb (berm-to-berm) width of forty (40') feet with an all-weather driving surface consisting of slightly weathered asphaltic concrete/macadam pavement.

The proposed private road serving the Project site exhibits original and unfinished grading, with a decomposed granite and dirt surface measuring twenty-six (26') feet between proposed curb lines.

#### **4.2.3 - Over-Length Road Conditions**

The County of San Diego has indicated that over-length road conditions exist at the project site. The travel distance between the cul-de-sac at the west end of the Project's proposed private roads is approximately 1600 feet from the intersection of Jamul Highlands Road and Lyons Valley Road, where two directions of evacuation travel become available.

Section 503.1.3 of the San Diego Consolidated Fire Code prescribes the maximum length of dead-end roads.

<u>ZONING FOR PARCEL SERVED BY DEAD-END ROAD(s)</u>	<u>CUMULATIVE LENGTH OF DEAD-END ROAD(s)</u>
Parcels zoned for less than 1 acre	800 feet
Parcels zoned for 1 acre to 4.99 acres	1,320 feet
Parcels zoned for 5 acres to 19.99 acres	2,640 feet
Parcels zoned for 20 acres or larger	5,280 feet

The proposed fire apparatus access road for the Project site exceeds the maximum dead end road length requirement by approximately 280 feet.

***Finding:*** The County of San Diego Development and Planning Services *approved* the grading plan, *including* the over-length maximum road length, for the Project site on Permit # PDS2015-LDGRMJ, dated February 27, 2017.

***Mitigation Strategies for the over-length road conditions will be provided in Section 5.1.1.***

#### **4.2.4-- On-Going Road Maintenance**

The project developer has three options for funding private road maintenance:

1. California Civil Code Section 845 – requires that the owner(s) of a private road easement to maintain the road in good repair through formal agreements or proportional sharing of costs incurred. Enforcement of the in perpetuity road maintenance operations is by legal action in a court of law having jurisdiction over the right-of-way or by judgment of an impartial arbitrator. The judgment may be enforced as a money judgment by any party against any other party to the legal action taken.
2. County of San Diego Private Road Maintenance Agreement - as authorized by Section 21065 of the California Public Resources Code and Sections 81.402(c)(1) and 81.703(c)(1) of the County of San Diego Code of Regulatory Ordinances, the developer, individual lot owners and the County may enter into private road maintenance agreements. This type of agreement binds current and future lot owners to provide equal and proportional sharing of road maintenance costs that include, but are not limited to, the following operations - reasonable and normal road improvement and maintenance work to adequately maintain said private road easement and related drainage facilities to permit all weather access, filling of chuck holes, repairing cracks, repairing and resurfacing of roadbeds, repairing and maintaining drainage structures, removing debris, maintaining signs, markers, striping and lighting, if any, and other work reasonably necessary or proper to repair and preserve the easement for all weather road purposes.

3. Creation of a Permanent Road Division – A Permanent Road Division zone is a special district established at the request of property owners with a common road related need in a specific area for repairs and maintenance. Property owners must pay all of the costs of the PRD through a special benefit assessment or parcel charge assessment on their property tax bill. The cost to each individual property owner is determined by the benefit their property receives as a result of road repair and maintenance

## **4.3 Water Supply**

### **4.3.1 – Existing Water Distribution System**

Otay Water District provides a safe and reliable water supply to more than 223,000 customers in the communities of Otay Mesa, Chula Vista, Jamul, Spring Valley, Rancho San Diego, and unincorporated areas in southeastern San Diego County. To ensure water quality standards, Otay Water District purchases water from the water agencies listed below from continually tested water sources at treatment plants and other points within the water distribution system.

The water agencies delivering water to the Otay Water District include:

- The Colorado River
- The State Water Project
- San Diego County Water Authority
- Helix Water District
- Metropolitan Water District of Southern California.
- Desalinated water from the Carlsbad Desalination Project facilities

The Otay Municipal Water District, in cooperation with the San Diego County Fire Authority, has installed off-site fire hydrants on Jamul Highlands Road and on Lyons Valley Road. These hydrants are not evenly spaced and display evidence of installation, placement and spacing based on individual and independent property development projects.

The Water District has installed an underground water distribution main beneath or adjacent to the Jamul Highlands Road right-of-way corridor. The main has a ten (10") inch internal diameter.

### ***Findings:***

The District has installed a residential style (one 2-1/2" and one 4" discharge port) fire hydrant approximately 120 feet north of the intersection of Jamul Highlands Road and the private road proposed to service the Project site.

The District has installed a second residential fire hydrant approximately 800 feet south of the hydrant at the intersection of the proposed private road and Jamul Highlands Road. This hydrant is slightly south of 3310 Jamul Highlands Road on the east side of the right-of-way corridor.



A third residential fire hydrant is located on Lyons Valley Road, approximately 130 feet east of the intersection of Jamul Highlands Road and on the south side of the road.

A commercial style (two 2-1/2" and one 4" discharge port) is located at the church parking lot driveway east of the intersection of Lyons Valley Road and Jamul Highlands Road adjacent to the north shoulder of the right-of-way corridor. A second commercial fire hydrant is on the west side of the church parking lot.

### **Distance Between Hydrants for Single Family Dwellings**

**Table 507.5.1.1.1**

Parcel Size	Hydrant Spacing Requirement
Larger than 2-1/2 acres	Every 1000 feet
1/2 to 2-1/2 acres	Every 500 feet
Less than 1/2 acre	Every 300 feet

#### ***Finding:***

The private road serving the Project site is approximately 750 feet long. The proposed parcel size range from two to three acres, with smaller sized parcels placed on the eastern side of the Project and closer to the Jamul Highlands Road corridor and water infrastructure.

Parcel 1 (existing) – 3.075 acres, northwest corner of Project site

Parcel 2 – 3.025 acres, southwest corner of Project site

Parcel 3 – 2.0 acres, southeast corner of Project Site

Parcel 4 – 2.4 acres, southwest corner of the Project Site

The proposed construction pads for single family dwellings on Parcels 3 and 4 are within 500 feet of the fire hydrant north of the Project's private road entrance. The proposed construction pads for Parcels 1 and 2 are within the required 1000 feet from the fire hydrant north of the private road entrance.

***Finding:*** The Otay Municipal Water District has issued a Project Facility Availability Form indicating that a) the Project Site is within the District and b) that existing District infrastructure has the capability of adequately servicing the Project Site and its proposed single family dwellings (***See Appendix G***)

***Finding:*** A 10" ACP water main has been installed beneath the Jamul Highlands Road right-of-way corridor. The water district has indicated that the water pressure available at the fire hydrant is approximately 110 p.s.i.

***Finding:*** For the County of San Diego 2500 g.p.m. fire flow capacity, a 10" ACP water main will have a friction loss rate of approximately 12.6 p.s.i. per 1000 feet of main length.

#### **4.3.2 Combined Domestic Well Water-Fire Protection Storage Tanks**

The County of San Diego has required the installation of water storage tanks on existing Parcel # 1. The property owner has installed two 10,000-gallon water storage tanks on the upper portions of Parcel#1, as indicated on the Project Site map.



The water tanks have been installed to conform with San Diego County Fire Authority standards and specifications.

TABLE NO. 903.3.2			
Building Square Feet	Gallons Per Minute Water Flow	Capacity Gallons	Duration Minutes
Up to 1,500	250	5,000	20
Over 1,500	250	10,000	40
When exposure distance is one hundred feet (100') or less from adjacent property, the following minimum fire flow shall be adhered to. Increases in water storage may be required by the Chief, depending on the square footage of the exposed structure. When protecting exposures within 100 feet or less, the minimum flow duration shall not be less than two (2) hours unless otherwise approved by the Chief.			
EXPOSURE DISTANCE		MINIMUM FIRE FLOW	
Over 100 Ft.		250 Gallons Per Minute	
31 Ft. – 100 Ft.		500 – 750 Gallons Per Minute	
11 Ft. – 30 Ft.		750 – 1000 Gallons Per Minute	
10 Ft. or less		1000 – 1500 Gallons Per Minute	

**Finding:** The installed water storage tanks have double the minimum required capacity of 10,000 gallons for proposed buildings with occupiable spaces over 1500 square feet.

**Finding:** All proposed building pads are within the required hydrant spacing distance for the hydrant north of the Project private road entrance. Estimated fire flows from the hydrant is 2500 g.p.m. The on-site 20,000-gallon storage tanks are supplemental water supply sources for the more reliable public water infrastructure system.

## **4.4 Ignition Resistant Construction and Fire Protection Systems**

### **4.4.1.1 – Existing Structures on Project Site**

There are no buildings or structures on the proposed Project Site.

All new and future buildings and structures will be required to conform to Chapter 7-A of the County of San Diego Building Code for Ignition Resistant Building Construction Standards for Wildland-Urban Interface Areas. Likewise, automatic fire sprinkler systems conforming to NFPA Standard 13-D for residential fire sprinklers in one and two family dwellings shall be installed for all buildings and auxiliary structures designated by the most current San Diego County Fire Authority local ordinances and the San Diego County Consolidated Fire Code.

### **4.4.1.2 – Existing Off-Site Structures**

There are currently no structures on the project site.

Off-site, the community around the project is zoned for, and developed as, residential occupancies.

## **4.5 Fire Fuel Assessment – Treated Project Site**

### **4.5.1 General Description of Vegetative Fuels**

The combination of required defensible space around structures and enhanced fire resistive building code requirements for the project site will remove and/or modify the existing highly flammable natural vegetation, creating an entirely different fuel model most resembling Urban Development (NB-1).

Fuel Model NB-1 includes lands covered with suburban development that will not support wild fire spread but may experience structural fire losses during vegetation fire incidents. Building ignitions usually occur from house to house exposures or from firebrands, neither of which are modeled by current Fuel Model parameters.

The fuel model sets currently used by fire scientists, fire behavior analysts and Fire Protection Plan consultants do not have the ability to simulate fire behavior changes created by various fuel treatments. Fuel Models are based on fully cured vegetation at or near their seasonal extinction moistures and, concurrently, at the worst part of the annual fire season. This tends to produce *over*-prediction of fire spread rates and other fire behavior parameters, especially in annual grass fuels.

The Fuel Model parameters used by BEHAVE-Plus for grass fuels expresses an extinction moisture content level of 15% for annual grasses and assumes a potential heat release rate of approximately 8000 BTUs per pound of fuel present on the landscape, whether the fuel is in a “live” or “dead” condition.



Irrigated lawns, as proposed as part of the defensible space guidelines for the project, will have a fuel moisture content of at least 120%. Fuel moisture contents of 120% result in green, non-cured vegetation, with all herbaceous materials remaining in the “live” fuel categories. As a result, grassy fuels with high fuel moisture content will produce flame lengths of one (1’) or less and have a rate of spread of approximately 5 chains (330 feet) per hour when exposed to a 20 m.p.h. mid-flame wind.

***Finding:*** Providing the recommended fuel modifications to the developed residential parcels converts the potential rate of fire spread across the landscape from 304 feet *per minute* to 330 feet *per hour*.

#### **4.5.2 Defensible Space and Vegetation Management**

##### **4.5.2.1 - Flammable Vegetation**

Strict compliance with the requirement for fuel modification zones with a 100 feet of depth may not be achievable on the Project Site due to site constraints.

In accordance with exceptions provided in Public Resource Code 4291, property owners that *cannot* provide 100 feet of defensible space are permitted to provide primary fuel modification zones on their land in a manner that provides the most achievable distance that is possible and reasonable given the constraints identified on the property. These alternative defensible space mitigations are limited to the area inside each individual parcel and cannot extend past established property lines.

The defensible space mitigations recommended for the Project site include the removal of combustible vegetation inside of property lines for distances, when available, of up to 100 feet away from the exterior wall surfaces of all proposed buildings. If 100 feet of defensible space cannot be achieved, the distance between all building exterior wall surfaces and property lines shall be converted to Fuel Modification Zone 1 defensible space requirements and maintained in-perpetuity.

##### **4.5.2.2 – General Principles of Fuel Modification Zones for Building Pads**

Fuel Modification Zones are specific areas on a property where vegetation has been removed, planted with alternative landscaping or modified in ways that increase the likelihood that a structure will survive a wildfire, improve defensible space around the structure for firefighting activities and prevent flame contact with the building from a spreading fire.

Under this strategy, combustible vegetation, including ornamental plants, non-native, naturalized or invasive plant species, are removed and are re-planted with fire- and drought tolerant species. Secondly, these plants may be thinned to decrease the available natural vegetative fuel loading on the property. The reduction of available fuel effects the flame lengths and the amount of heat produced by the fire and decreases fuels around houses that can ignite through firebrands and ember showers produced by wildfires moving across the landscape.

Each sub-zone in a Fuel Modification Plan is designed to decrease the amount of fuel available to a wildfire the closer the fire gets to a building. Additionally, the amount of moisture retained by plants inside Fuel Modification Zones increases as the distance from buildings decreases.

**Note:** It is always important to remember that adherence to Fuel Modification principles (removal of flammable vegetation, thinning flammable vegetation and providing irrigated fire resistant landscaping with in perpetuity maintenance of defensible space) does **not** guarantee structure survivability during wildfires. This strategy merely increases the chance of survivability to a reasonable level of relative safety.

Because of the nature of Southern California soils, it is imperative to consider the potential for hillside erosion and the need for slope stabilization:

- Every effort should be made to avoid the need for total removal of native vegetation on hillsides.
- Increasing structural setbacks for proposed structures on slopes will reduce the amount of work required on the adjoining hillside as well as improving defensible space around the structure.
- Efforts should be made to use modified native vegetation on slopes as much as possible to provide adequate hillside stabilization.
- Native plants are better adapted to local topography and provide important wildlife habitat and protection from erosion.

Erosion concerns, combined with the need to address water conservation measures, require the careful selection of plant species as well as the placement of pathways, patios, retaining walls and other landscaping features so that a well-designed fire-wise landscape provides an environment that accomplishes more than achieving the goal of fire safety mitigation.

Defensible space can be accomplished in ways other than plant modification. Paved brick, gravel pathways, rock borders, dry streambeds, water features, swimming pools and other features made of non-combustible materials can contribute to a structure's defensible space. Structural survivability can also be improved through the use of fire resistive building construction standards as outlined in Chapter 7-A of the California Building Code.

#### **4. 5.2.2.1 General Fuel Modification Zone Requirements**

##### **Fuel Modification Zone 1**

Fuel Modification Zone 1 comprises the first defensible space area surrounding a building and has a minimum width of 50 feet.

Fuel Modification Zone 1 includes the level building pad. If fifty (50') feet of defensible space is not obtainable around each structure on a lot, the individual lot owner is still

required to maintain his or her front, side and back yards to a zone depth of 50 feet on the flat building pad and on natural slopes or manufactured slopes around their homes with irrigated fire resistant Zone 1 landscaping requirements.

Plants in this irrigated Zone shall not include any pyrophytes, which are high in oils and resins. Pyrophytes include eucalyptus, cedar and juniper species (***see Appendix A - Prohibited Plant list***). Trees must be planted and maintained so that when they reach maturity their branches are at least 10 feet away from any structure.

The Zone 1 fire-resistant landscaped area is permanently irrigated and will consist of fire resistant and maintained plantings. Thick succulent or leathery leaf plant species are the most fire resistant; plants with paper-thin leaves and small twiggy branches are the least fire resistant.

Regular maintenance and continued irrigation is very important in Zone 1.

Plants with high moisture content are less likely to burn. Sidewalks, concrete patios, decorative rock, swimming pools, and similar landscape features may be included in this zone (and Zone 2) as these features will not support fire travel across the landscape.

This irrigated zone (unless irrigation causes erosion) consists of native and non-native fire resistant and maintained plantings less than 18 inches high. This Zone may also contain fire resistant specimen size trees or single well-spaced ornamental shrubs taller than 18 inches, intermixed with approved ground covers.

Although all plants will burn under extreme fire conditions, research has shown that some types of plants, including many natives, are more fire resistant than others.

The Recommended Plant List in ***Appendix ‘A’*** includes a list of low fuel volume, non-oily, non-resinous plants commonly referred to as “fire resistant”.

The term “fire resistant plants” comes with the following caveats

- These plants must be annually pruned
- All dead wood and materials must be removed on an annual or as-needed basis
- All grasses or other plant material are removed from beneath the circumference of their shrub and tree canopies.

The Recommended Plant List in ***Appendix ‘A’*** includes native species occurring on the project property that are not considered undesirable from either a biological or wildfire risk management perspective if they are properly maintained by June 1st of each year.

(***See Appendix D*** for additional Fuel Modification Zone 1 requirements).

### **Fuel Modification Zone 2**

Fuel Modification Zone 2 starts at the outer perimeter edge of Zone 1 and extends outward for an additional 50 feet. If required by the local Fire Authority Having



Jurisdiction, FMZ-2 *may* extend beyond the minimum required 50 feet when extreme fuel conditions are present.

Zone 2 Fuel Modifications thin existing vegetation canopies by a factor of fifty percent (50%), especially in undesirable plants (***See Appendix A***). FMZ-2 also requires the removal of dead and dying materials in vegetation canopies; thinning, lacing and pruning of branches; and mowing and weed-whipping of grasses and weedy plants. Landscaping and maintenance of plantings will include limited irrigation to ensure establishment of fire-resistant landscaping (ground covers, shrubs and trees).

(***See Appendix D*** for Fuel Modification Zone 2 requirements)

#### **4.5.2.2.2 - Defensible Space Around Buildings**

Fuel modification zones are required around *every* building designed for human habitation *and* buildings designed to house farm animals.

Fuel modification zones shall comply with the following requirements:

(a) When a building is located 100 feet or more from the property line, the fuel modification zone shall have a depth of 100 feet from habitable buildings. The area within the first fifty (50') feet of buildings shall be cleared of non-fire resistive vegetation and re-planted with fire-resistant plants or approved irrigated landscaping. In the area between 50 to 100 feet from a building, all dead and dying vegetation shall be removed. Native vegetation may remain in this area if the vegetation is modified and thinned so that combustible vegetation does not occupy more than 50% of the area. Trees may remain in both areas provided that the horizontal distance between crowns of adjacent trees and crowns of trees and structures is not less than 10 feet.

(b) When a building or structure in a hazardous fire area is setback less than 100 feet from the property line, the requirements above shall be met to the extent possible in the area between the building and the property line.

(c) The building official and the FAHJ may provide lists of prohibited and recommended plants. Samples of prohibited and recommended plant lists are included in Appendix A.

(d) When the subject property contains an area designated to protect biological or other sensitive habitat or resource, no building or other structure requiring a fuel modification zone shall be located so as to extend the fuel modification zone into a protected area.

All required Fuel Modification Zones and Defensible Spaces shall be in place prior to Final Building Inspection and issuance of a Certificate of Occupancy. Fuel Modification Zones and Defensible Space shall be maintained in perpetuity.

Representatives of the San Diego County Fire Authority shall have the right to enter private property to insure the fuel modification zone requirements are met.

#### **4.5.3 Vegetation Management Practices**

Fuel Modification Zones must be maintained to fulfill the requirements of this Fire Protection Plan and meet the requirements of the San Diego County Fire Authority. Maintenance shall include, but is not limited to, initial planting, weeding, irrigation installation, maintenance and plant pruning, the removal of dead or dying and downed vegetation and replacement of plants as required.

The following requirements shall apply to this project:

1. Each property owner shall be responsible for all irrigation and landscaping of Fuel Modification Zones within their property boundaries. Fuel Modification Zones and Defensible Space shall be limited to the area within established property lines and shall not extend off-site of established parcels.
2. The San Diego County Fire Authority will hold each parcel owner within the proposed project accountable for enforcement of all wildfire protection issues discussed in this Fire Protection Plan.
3. Each property owner shall not allow dumping of trash or disposal of yard trimmings within Fuel Modification Zones and Defensible Space areas.
4. The SDCFA, or its designated representative(s), shall decide any disputes relating to individual lot landscaping or fuel treatments involving the interpretation of this Fire Protection Plan. Decisions made by the SDCFA shall be final and binding on property owners.
5. If modifications to the Tentative Map Plans occur, any and/or all of the Fire Protection Plan may be revised at the discretion of the SDCFA.
6. All exterior boundaries of Zones 1 and 2 Fuel Modification Zones shall be permanently marked on the ground for the purpose of guiding annual fuel management maintenance and inspection operations. The most reliable markers are steel fence posts with a baked-on painted finish. The upper half of the aboveground portion of the fence post shall be painted a bright “day-glow” orange color to improve visibility. Fuel Treatment Zone markers shall be spaced so that other markers on each side of installed markers can be readily seen from that marker.
7. Brush removal shall be completed prior to commencing any flammable construction.
8. During construction at least 50 feet of clearance around the structures shall be free of all flammable vegetation as an interim fuel modification zone during construction of any structure.
9. Debris and trimmings produced by thinning and pruning will be removed from the site
10. The annual completion of all designated Fuel Modification Treatments will occur before June 15<sup>th</sup>.
11. All individual landscaping plans, including additional structures, will comply with the Fire Protection Plan.

12. Trees and plants will be planted in accordance with the County of San Diego Approved Plants for Defensible Space in Fire Prone Areas List as shown in Appendix A or as approved by the SDCFA.

## **4.6 Cumulative Impact Analysis**

San Diego County's weather, fuel, and terrain contribute to the development of intense, uncontrolled wild fires as evident by the recent Cedar, Paradise and Otay fires of October 2003 and the Witch, Harris and Poomacha Fires of 2007.

The areas of greatest concern for the impact of wild fires on developments are projects immediately adjacent to, or intermixed with, undeveloped wild land areas or unmanaged vegetation stands in Open Space preserves. As the population of San Diego County increases and the Wildland Urban Interface (WUI) expands, fire hazards and risks will continue to be encountered. Vehicle access to residential subdivisions next to WUI areas or Open Space easements and an increase in other human activities in these areas increases the risk of property loss, injury or death and contribute to the impact of potential wild land fires.

The proposed development of the parcel is a partial "in-fill" project between existing developed residential properties and unmanaged vegetative fuel beds.

***NOTE:*** There are physical indications on Jamul Highlands Road that the approximately 14 acre parcel immediately south the Project Site will have a proposed land division to four parcels and will be available for development in the near future. In combination with the Project Site, this will remove approximately twenty-five (25) acres of brush covered land from the surrounding area, which has been mostly developed for single family dwellings.

TPM-21255 proposes a four (4) lot land division, including an existing, approved parcel, for future residential development on a currently undeveloped parcel covered with unmanaged native, naturalized and invasive vegetation. The existing undeveloped parcel represents a potentially significant fire hazard to adjacent off-site properties and creates an unrestricted path of fire extension into developed residential areas. These threats will continue until the mitigations proposed by this Fire Protection Plan are implemented with the development of the four parcels.

Development of the TPM-21255 property will take advantage of the existing water distribution infrastructure for water supply and fire hydrant distribution. In exchange, the parcels will be added to the service rolls of Otay Municipal Water District customers and will be expected to participate in service fees and the costs of future infrastructure improvements.

Development of the TPM-21255 properties will have a positive impact on San Diego County Fire Authority finances. The current San Diego County Fire Mitigation Fees, based on \$0.56 per square foot of habitable space, will provide an initial return of



between \$1400.00 (anticipated 2500 square foot Single Family Dwelling) to \$2240.00 (4000 sq.ft. SFD) to the District for capital improvements such as apparatus replacement, hose purchase, fire station maintenance and firefighting equipment.

Based on a minimum \$400,000 sales price, the proposed single family dwelling on the project site will produce an annual combined and approximated property tax and assessment fee income of \$ 4100.00 to the County of San Diego and the SDFCA. These figures are based on estimated \$4000.00 per year in 1% general San Diego County property taxes per residence and Fire Suppression Assessment of \$100.00 per parcel (ten units per SFD)

## **CHAPTER 5 MITIGATION MEASURES & DESIGN CONSIDERATIONS**

### **5.1 – Road and Access Mitigations**

#### **5.1.1 Existing Road and Access**

Jamul Highlands Road is a public street with an asphaltic concrete driving surface that appears relatively well maintained. The paved width of Jamul Highlands Road is forty (40') feet curb-to-curb as measured between paved berms.

The proposed private road serving the Project site exhibits original and unfinished grading, with a decomposed granite and dirt surface measuring twenty-six (26') feet.

The County of San Diego has indicated that over-length road conditions exist at the project site. The travel distance between the cul-de-sac at the west end of the Project's proposed private roads is approximately 1600 feet from the intersection of Jamul Highlands Road and Lyons Valley Road, where two directions of evacuation travel become available.

#### **5.1.2 – Proposed Mitigations**

The following strategies are submitted as Alternate Means of Compliance Mitigations for the over-length roadways proposed for the Project:

1. Fire apparatus access roads shall have a minimum unobstructed paved width of twenty-four (24') feet. Fire apparatus access roads for purposes of this mitigation strategy include Jamul Highlands Road and the proposed private road exclusively serving the project site.

#### ***Findings:***

- A. Jamul Highlands Road provides an unobstructed paved width of forty (40) feet from the Project Site entrance to Lyons Valley Road.

- B. There are no constraints or narrow points along Jamul Highlands Road between the Project Site and the intersection of Jamul Highlands Road and Lyons Valley Road.
- C. The proposed private road exclusively serving the Project has a graded width of twenty-six (26') feet. The private road will be paved to Code required twenty-four (24') feet as part of development requirements.
- D. The Project Site is on lands designated as State Responsibility Area for wild fire suppression responsibility.
- E. CCR Title 14 regulating fire protection matters for SRA indicates that the minimum width for residential buildings is twenty (20') feet.
- F. For some areas of San Diego County, Consolidated Fire Code Table 503.2.1.1 indicates that road phasing width requirements are available for single family dwellings on existing legal parcels. Parcel # 1, prior to the proposed lot division, is a legally existing parcel with a County approved grading permit for the private roadway that serves the other proposed parcels on the Project Site.
- G. Per Table 503.2.1.1, four (4) single family dwellings are allowed an improved paved width of twenty (20') feet.

### ***Mitigations:***

- 1. The improved graded width of the proposed private road serving the Project site is twenty-six (26') feet. The private road will have a paved width of twenty-four feet, which meets the County Fire Code's improved paved width requirement and the SRA minimum required width by four (4') feet.
- 2. The improved paved width of the Jamul Highlands Road serving the Project site is forty (40') feet. This exceeds the minimum improved paved width by sixteen (16') feet and the SRA minimum required width by twenty (20') feet.
- 3. The private road shall provide a paved all-weather driving surface capable of supporting the imposed load of a 75,000 lb. fire apparatus.
- 4. Private driveways for single family dwellings shall have a minimum improved paved width of sixteen (16') feet. Private driveways shall be required to meet the weight bearing capacity of private and public roadways for fire apparatus weight impositions.
- 5. Roadways and driveways shall have a maximum grade of 20%. Road gradients between zero (0%) and fifteen (15%) per cent shall be paved with asphaltic concrete (asphalt; macadam) surfaces. Road grades between fifteen (15%) and twenty (20%) per cent shall be paved with Portland cement concrete driving surfaces with a deep broomed finish that is perpendicular to the direction of apparatus travel to enhance traction.
- 6. The angle of approach and departure at the intersection of driveways and roads shall not exceed seven (7) degrees of a 12% slope.

7. Electric gates are proposed for the entrance to the Project site upon completion of the development. To mitigate for the over length road condition, the gates shall be provided with an approved emergency key operated switch that overrides all command functions and opens the gate, locking it in the open position. This will allow additional emergency response resources to enter the Project Site without further delay. In addition to the emergency key switch, the gate(s) shall be provided with an approved emergency traffic controlling strobe light sensor that will activate the gate on the approach of emergency response vehicles (SDCCFC 503.6). Automatic gates shall be provided with battery back-up systems or manual mechanical disconnects in the event of power failures.
8. Electric gates shall be allowed to serve individual parcel driveways on the private road serving the Project site. Automatic gates across private driveways shall be equipped with an approved emergency key-operated switch that overrides all command functions and opens the gate. Automatic gates shall be provided with battery back-up systems or manual mechanical disconnects in the event of power failures.

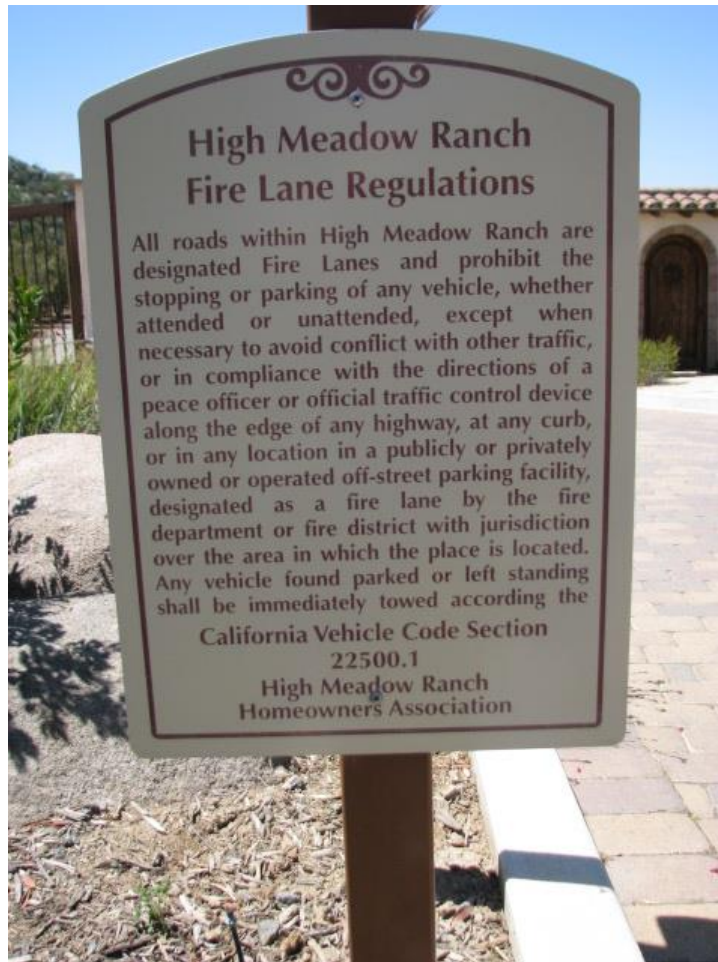
**Finding:** There are a number of private roadways adjacent to and further south of the proposed Project Site that have automatic gates across fire apparatus access roads/private streets.







9. Electric gate openers shall be listed according to UL Standard 325 and shall be designed, constructed and installed to comply with the requirements of ASTM F2200.
10. All roads, excluding private driveways, with an improved paved width of less than thirty-six (36') shall be considered Fire Apparatus Access Roads (Fire Lanes).
11. Fire Lanes will be identified by an approved sign at the gated entrance to the development site. The language on the gateway sign shall indicate that the primary road servicing the Project site is a Fire Lane and establishes a no parking stipulation along that roadway. The Fire Lane shall extend from the private road intersection with Jamul Highlands Road to the entrance of the cul-de-sac bulb.



*Typical Approved Gateway Fire Lane/No Parking Sign*

**NOTE:** The content a proposed gateway fire lane identification sign for the Project Site does not necessarily need to follow the format and content of the typical sign referenced above. Content and format of the gateway sign will be open for discussion with SDCFA and County of San Diego DPS representatives.

## **5.2 – Water Supply Mitigations**

### **5.2.1 Existing Water Supply**

The Otay Municipal Water District has issued a Project Facility Availability Form indicating that a) the Project Site is within the District and b) that existing District infrastructure has the capability of adequately servicing the Project Site and its proposed single family dwellings.

A 10” ACP water main has been installed beneath the Jamul Highlands Road right-of-way corridor. The water district has indicated that the water pressure available at the fire hydrant is approximately 110 p.s.i.

The Otay Municipal Water District has installed a residential style (one 2-1/2" and one 4" discharge port) fire hydrant approximately 150 feet north of the intersection of Jamul Highlands Road and the private road proposed to service the Project site.

The County of San Diego has required the installation of water storage tanks on existing Parcel # 1. The property owner has installed two 10,000-gallon water storage tanks on the upper portions of Parcel#1, as indicated on the Project Site map. The installed water storage tanks have double the minimum required capacity of 10,000 gallons for proposed buildings with occupiable spaces over 1500 square feet.

The Otay Municipal Water District has required the following installations at the Project Site:

1. Plans developed for any fire service purposes must be in accordance with District Standards
2. Fire service lines (intended for *commercial* automatic fire sprinkler systems) shall be provided with a reduced pressure back-flow preventor device.
3. The fire service line shall not be connected directly to buildings and is solely intended for fire protection purposes only.
4. Water furnished for fire hydrants and commercial fire sprinkler services shall be used only for fire protection purposes.

### **5.2.2 Proposed Mitigations**

#### ***Findings:***

1. All proposed building pads are within the required hydrant spacing distance for the hydrant north of the Project private road entrance. Estimated fire flows from the hydrant is 2500 g.p.m.
2. The on-site 20,000-gallon storage tanks are supplemental water supply sources for the more reliable public water infrastructure system.

***The Project is in compliance with established water supply standards.***

***Provision of two 10,000-gallon water storage tanks on the Project site exceeds minimum County standards for on-site storage facilities and provides additional water services that are not usually required with the compliant installation of a fire hydrant and public water delivery infrastructure immediately adjacent to, and available to, the Project.***

***No additional mitigations are required.***

### **5.3 – Ignition Resistant Construction and Automatic Fire Sprinkler Mitigations**

#### **5.3.1 Existing Structures**

There are no existing structures at the project site.



### **5.3.2 Proposed Mitigations**

All new and future buildings and structures will be required to conform to Chapter 7-A of the County of San Diego Building Code for Ignition Resistant Building Construction Standards for Wildland-Urban Interface Areas and California Building Code Chapter 7-A construction standards.

Examples of detailed, but not-all-inclusive, requirements for building construction in Very High Severity Areas are included in ***Appendix C***.

All new habitable residential buildings, structures and attached garages shall have National Fire Protection Association Standard 13-D compliant automatic residential fire sprinklers installed per the San Diego County Consolidated Fire Code standards and requirements.

#### ***Findings:***

Residential automatic fire sprinkler systems compliant with NFPA 13-D are designed to control incipient stage fires to the room of origin and allow the occupants to escape from the premises before flashover occurs in the building.

Statistics about the design and effectiveness of NFPA 13-D sprinkler systems indicate that these fire protection systems effectively control *and extinguish* incipient stage fires with the activation of one or two sprinkler heads before the arrival of the fire department.

NFPA 13-D Residential Sprinkler Systems that do not have a water supply connection to a permanent water distribution main system are required to have a minimum ten (10) minute discharge time when supplied from water storage tanks or other private water distribution and storage system.

All residential fire sprinkler systems in the Project Site will be connected to an Otay Municipal Water District maintained and operated domestic water system with an unlimited supply of water.

The presence and operation of the NFPA 13-D residential sprinkler systems should effectively contain, if not control, foreseeable room and contents fires inside of residential buildings before the arrival of responding Fire Department resources.

### **5.3.3 Recommended Mitigations:**

In the event that the San Diego County Fire Authority or SDFCA Fire Prevention Office requires additional mitigations for defensible spaces having less than 100 feet of depth, the following mitigations may be available if reasonably required:

- A. Substitute twenty (20) minute dual pane windows with dual pane windows tested and listed by an approved Testing Laboratory. These windows may have a minimum one-half (1/2) hour or forty-five (45) minute fire resistive rating.
- B. Substitute any proposed sliding doors with dual-pane vinyl or tempered glass with those as recommended in “A”.
- C. Extend any proposed balcony decks and platforms to the maximum permitted depth allowed by the Building Code to:
  - 1. Prevent vertical fire extension from floor-to-floor through building openings
  - 2. Limit the impact of convective heat-plumes on exposed windows and openings
  - 3. Balcony overhangs shall be constructed with non-combustible or minimum one-hour Fire Resistive rated coverings.
- D. Limit the maximum area of exterior wall openings based on California Building Code Table 705.8, dependent upon built-in fire protection and distance between the exposed building and wild land fire sources.
- E. Provide Automatic fire sprinklers beneath balconies on the west and north side of the building that overlook the Open Space Area. Fire sprinklers may be sidewall or standard spray pendant types.
- F. If reasonably required, and as a last case mitigation, provide automatic fire shutter systems on exposed windows and doors incorporating windows.



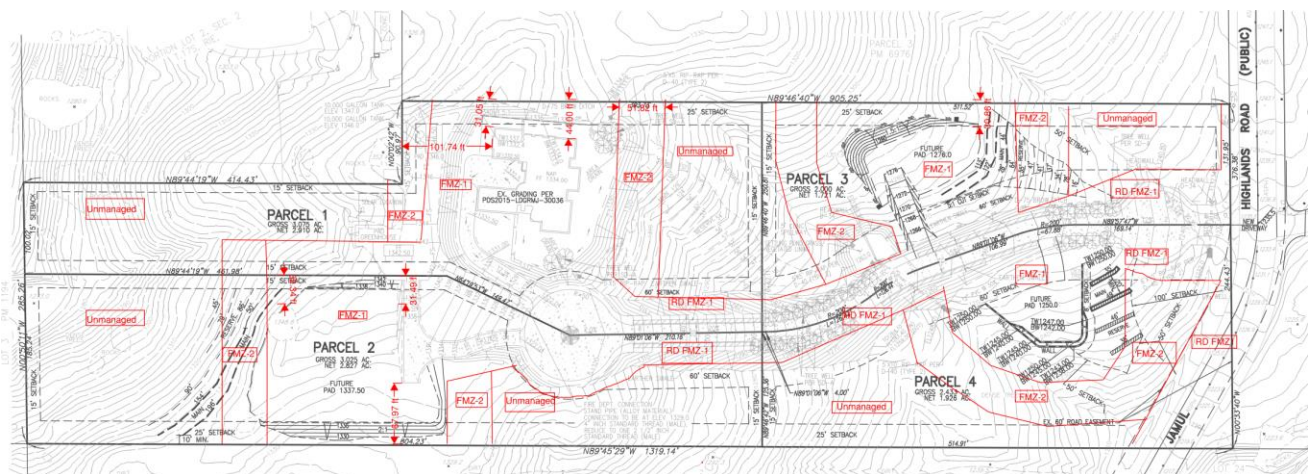
***Typical Window Fire Shutter Assembly***

## **5.4 - Defensible Space and Fuel Modification Mitigations**

As previously stated, Fuel Modification Zones on properties are areas where vegetation has been removed, planted with alternative landscaping or modified in other ways to increase the likelihood that structures will survive a wildfire, improve defensible space around the structure for firefighting activities and prevent flame contact with the building from spreading fires.

The project site is on a mild to moderately steep east aspect hillside (average slope 14.7% with maximum 19.4%) on the west side of the Jamul Highlands Road right-of-way. Vegetation on the Project Site is a mixture of Southern California Chaparral shrub and brush types. The vegetative fuels have uninterrupted continuity and fuel heights exceeding seven (7') feet over extended areas of the Site.

The estimated fuel age is five (5) to forty plus (40+) years.



***Proposed Defensible Space & Fuel Modifications***

After site visitation and evaluation of the fire behavior characteristics and identified hazards of the flammable vegetation on the Project site, the following defensible space and fuel modification recommendations are proposed.

The proposed combination of required defensible space around structures and enhanced fire resistive building code requirements for the project site will remove and/or modify the existing highly flammable natural vegetation, creating an entirely different fuel model most resembling Urban Development (NB-1).

Fuel Model NB-1 includes lands covered with suburban development that will not support wild fire spread but may experience structural fire losses during vegetation fire incidents. Building ignitions usually occur from house to house exposures or from firebrands, neither of which are modeled by current Fuel Model parameters.

### **5.4.1 – Proposed Mitigations**

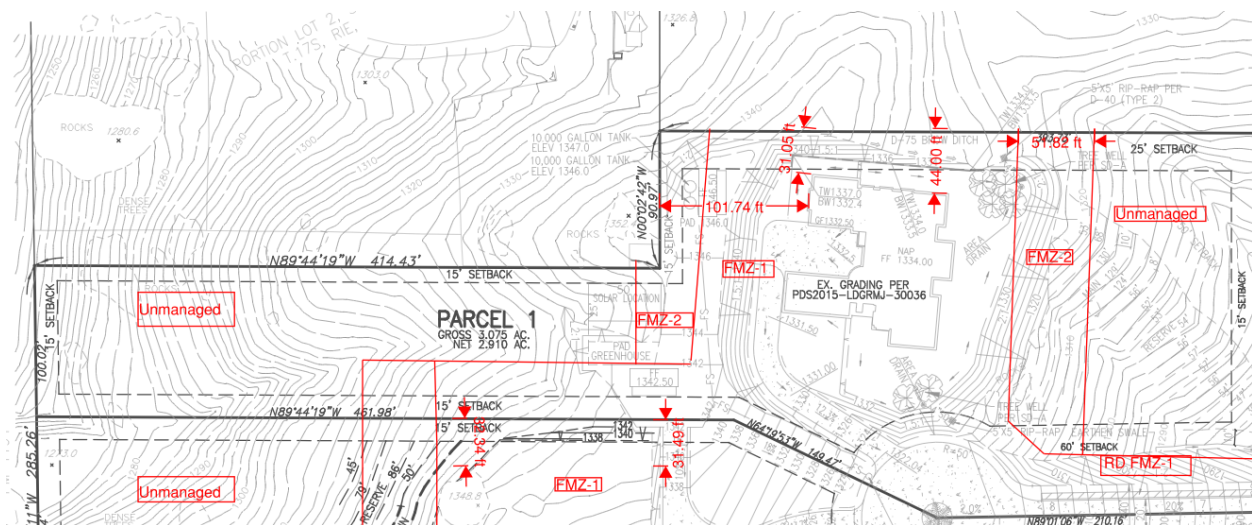
## **Parcel # 1**

Parcel # 1 is at the northwestern corner of the Project site and has a gross lot size of 3.075 acres. This parcel was previously approved for development and is considered the existing parcel on the Project Site.

Parcel # 1 has been graded and has a split level configuration.

The upper pad is graded relatively flat and two 10,000-gallon water tanks have been installed near the northeastern corner of this area.

The lower level has been graded and is relatively flat. It is depressed below the upper pad by an estimated twenty (20') feet of height difference. Along the northern property line, the lower level pad has been designed to have prominent swale, with the flat grading lower than the adjacent undeveloped property. The swale line curves behind the proposed building pad in a northeast to southern configuration, forming a barrier between the proposed single family residence on this parcel and existing unmanaged vegetative fuels on the adjacent property.



***Parcel # 1 Proposed Fuel Modification Zones & Defensible Space***





*Configuration and Grading of Parcel # 1, Looking Northeast from Water Tank Pad*

### Proposed Defensible Space and Fuel Modifications

Beyond the upper pad of this lot, most of the western part of Parcel # 1 may remain in an unmanaged state or can be treated as Fuel Modification Zone 3. Fuel Modification Zone 3 would be a modification of FMZ-2 Standards, with 25% thinning of fuels at the extreme west side of the area, progressing eventually to 50% thinning as distance towards the eastern portion of this area increases.

On the south side of the “shoulder” of Parcel 1, a forty (40’) foot wide by 225-foot long strip of Fuel Modification Zone 1 defensible space will be established along the property line with Parcel # 2 (or Fuel Modification Zone 2, if approved and reasonably required by the FAHJ).

On a west-to-east axis, the following defensible space is available between the proposed building and property lines:

- Fifty (50’) feet of FMZ-1 defensible space
- One-hundred (100’) feet of FMZ-2 defensible space

On the south side of Parcel 1, all lands will be modified to provide FMZ-1 defensible space. One-hundred (100’) feet of defensible space is available, with depth of defensible space extending to the center line of the private roadway between Parcels 1 and 2.

On the north side of Parcel 1, the distance between the proposed building and the property line measures as follows:

- Northwest corner – thirty-one (31') feet
- Northeast corner – forty-four (44') feet

The topographic swale along the northern property line forms a horizontal and vertical separation between the buildable residential lot.

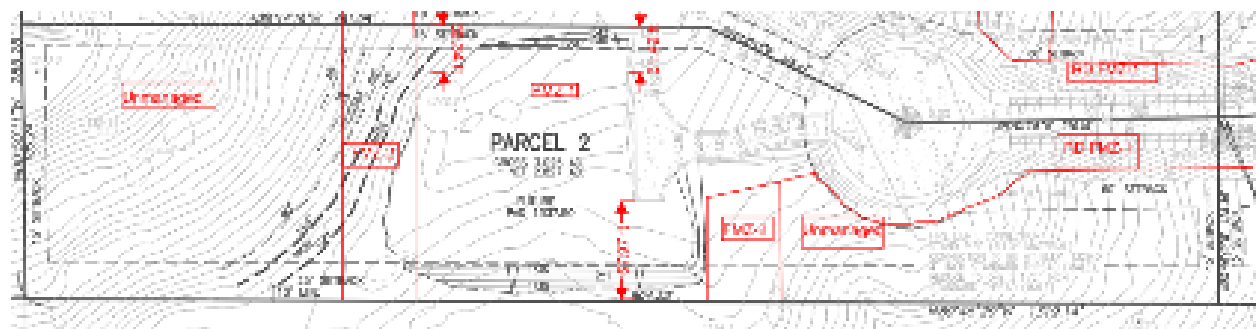
### ***Mitigations for North Property Line Area:***

- 1. All land between the proposed building and the northern property will be treated to establish in-perpetuity FMZ-1 defensible space.***
- 2. A CMU or other approved block fire and heat deflection wall, with a minimum height of four (4') feet, will be erected along the northern property line. The heat-fire deflection wall will parallel the northern property line facing the proposed residential building.***
- 3. Off-Site Mitigations: The Project Site developer has an agreement with the neighboring property owner to the north which allows the Project developer and future residents to conduct fuel modification work on the adjacent property to provide a 100 feet of defensible space for parcels on the north side of the Project site.***

### **Parcel 2**

Parcel # 2 is at the southwestern corner of the Project site and has a gross lot size of 3.025 acres.

Except for a partial driveway entrance area, Parcel # 2 has not been graded and the vegetation is in its natural state and condition.



***Parcel # 2 Proposed Fuel Modification Zones & Defensible Space***



*Parcel # 2, Looking West from Partially Graded Proposed Driveway Entrance*

### Proposed Defensible Space and Fuel Modifications

Most of the western part of Parcel # 2 may remain in an unmanaged state or can be treated as Fuel Modification Zone 3.

On a west-to-east axis, the following defensible space is available between the proposed building and property lines:

- Fifty (50') feet of FMZ-1 defensible space
- One-hundred (100') feet of FMZ-2 defensible space

On the south side of Parcel 2, all lands will be modified to provide FMZ-1 defensible space.

On the north side of Parcel 2, when combined with the recommended FMZ-1 defensible space on Parcel # 1 referenced above, one-hundred (100') feet of defensible space is available. The depth of this defensible space extends to the center line of the private roadway between Parcels 1 and 2.

### ***Mitigations for South Property Line Area:***



- 1. All land between the proposed building and the southern property will be treated to establish in-perpetuity FMZ-1 defensible space.***
- 2. A CMU or other approved block fire and heat deflection wall, with a minimum height of four (4') feet, will be erected along the southern property line. The heat-fire deflection wall will parallel the southern property line facing the proposed residential building.***
- 3. Off-Site Mitigations: The Project Site developer has an agreement with the neighboring property owner to the south which allows the Project developer and future residents to conduct fuel modification work on the adjacent property to provide a 100 feet of defensible space for parcels on the south side of the Project site.***

### **Parcel 3**

Parcel # 3 is at the northeastern corner of the Project site and has a gross lot size of two (2) acres.

Parcel # 3 has not been graded and the vegetation is in its natural state and condition.



***Parcel # 3 Proposed Fuel Modification Zones & Defensible Space***





*Parcel # 3, Looking East from Parcel # 1*

### Proposed Defensible Space and Fuel Modifications

At the southwest and northeast corners of the Parcel, vegetative fuels are more than 100 feet from the proposed building pad and anticipated exterior walls of a proposed residential building. This vegetation may remain in an unmanaged state or can be treated as Fuel Modification Zone 3.

On a west-to-east axis, the following defensible space is available between the anticipated location of a building and property lines:

- Fifty (50') feet of FMZ-1 defensible space
- One-hundred (100') feet of FMZ-2 defensible space

On the south side of Parcel 3, all lands will be modified to provide appropriate FMZ-1 and FMZ-2 defensible space depending distance from the proposed residential pad.

On the north side of Parcel 3, the distance between the edge of the proposed building pad and the property line measures as follows:

- Northeast corner – thirty-one (31') feet
- Northwest corner – approximately sixty (60') feet

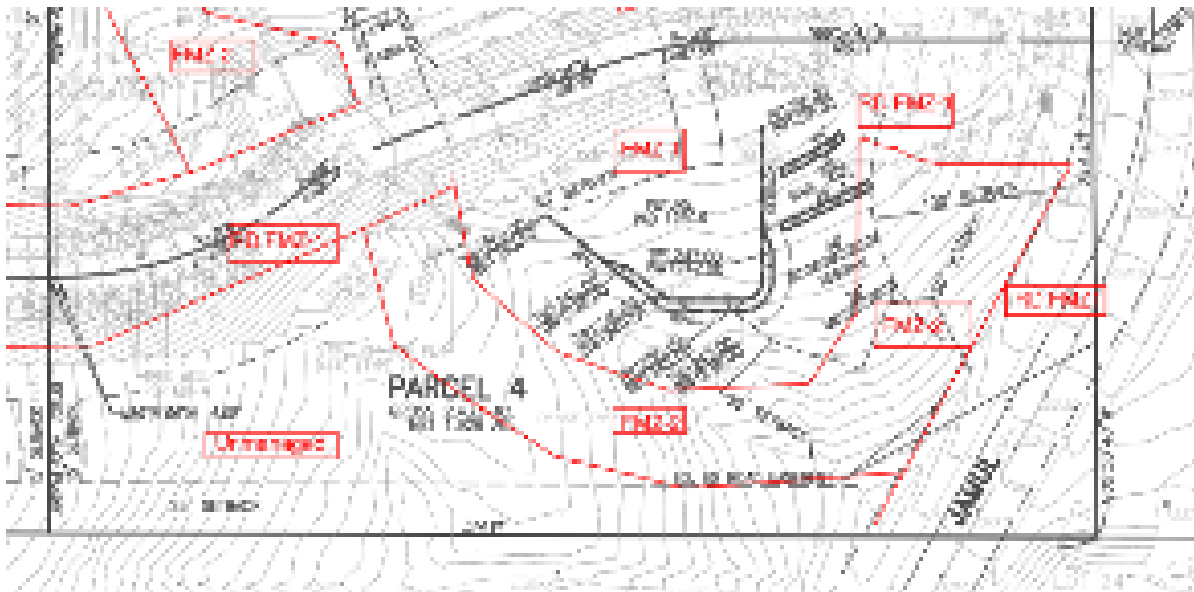
### ***Mitigations for North Property Line Area:***

- 1. All land between the proposed building and the southern property will be treated to establish in-perpetuity FMZ-1 defensible space.***
- 2. A CMU or other approved block fire and heat deflection wall, with a minimum height of four (4') feet, will be erected along the northern property line. The heat-fire deflection wall will parallel the northern property line facing the proposed residential building.***

### **Parcel # 4**

Parcel #4 is at the southeastern corner of the Project site and has a gross lot size of 2.4 acres.

Parcel # 4 has not been graded and the vegetation is in its natural state and condition.



***Proposed Parcel # 4 Fuel Modifications and Defensible Space***



*Parcel #4, Looking East from Property Line of Parcels 2 & 4*

### Proposed Defensible Space and Fuel Modifications

Most of the western part of Parcel # 4 may remain in an unmanaged state or can be treated as Fuel Modification Zone 3.

On a west-to-east axis, the following defensible space is available between the proposed building and property lines:

- Fifty (50') feet of FMZ-1 defensible space
- One-hundred (100') feet of FMZ-2 defensible space

On the south side of Parcel 4, approximately 125 feet of space is available between the proposed building pad and the southern property line. The land on the south side of the proposed building pad will be modified to provide appropriate FMZ-1 or FMZ-2 defensible space as determined by distance from the building pad.

On the north side of Parcel 4, adequate space is provided for both FMZ-1 and FMZ-2 defensible space when defensible space extends to the center line of the private road serving the Project site.

The Project grading plan indicates that Parcel # 4 has a proposed CMU retaining wall that forms the southern perimeter of the proposed building pad. This retaining wall may act as a heat and fire deflection wall as recommended for placement on Parcels 1 and 2.

### ***Mitigations:***

**The design of Parcel # 4 has sufficient land mass to provide 100 feet of defensible space and Fuel Modification without further mitigation(s).**

## **Roadside and Driveway Defensible Space**

### **Driveway Fuel Modification Zones**

All driveways shall provide a Roadside Fuel Modification Zone.

Driveway Fuel Modification Zones shall have a minimum dimension of thirty (30') on each side of the driveway.

Driveway Roadside Fuel Modification Zones shall comply with Fuel Modification Zone 1 requirements. No flammable vegetation shall be planted, or allowed to remain, in the area used for designated Roadside Fuel Modification Zones.

Driveway Fuel Modification Zones may be incorporated into the areas designated as parcel Fuel Modification Zone 1. Driveways traversing designated Fuel Modification Zone 2 and non-mitigated parcel areas shall provide in-perpetuity Fuel Modification Zone 1 mitigations for depth and vegetation management.

### **Road Side Fuel Modification Zones**

Roadside Fuel Modification Zones shall be provided along the lengths of all proposed Project streets.

Roadside Fuel Modification Zones shall have a minimum depth of thirty (30') feet on each side of the street's right-of-way. Roadside Fuel Modification Zones shall provide in-perpetuity Fuel Modification Zone 1 mitigations. No flammable vegetation shall be planted, or allowed to remain, in any designated Roadside Fuel Modification Zone area.

#### **5.4.2 Property Line Setbacks**

The minimum Fire Setback from any property line in designated High Fire Hazard Areas is generally thirty (30') feet. Exceptions may be allowed for parcels smaller than one acre, upon review and approval from the Fire Authority Having Jurisdiction. Minimum setback from property lines abutting national forests, open space preserves, and designated riparian areas is 100 feet.

Top of Slope Setbacks for single story residences shall be a minimum of fifteen (15') feet with a maximum building height of twelve (12') feet. Two story residences shall have a minimum Slope Setback of thirty (30') feet.

***Finding:*** All proposed buildings and building pads on the Project site meet the minimum thirty (30') foot property line setback.

#### **5.4.3 - Defensible Space Vegetation Exemptions**



1. Single specimens of trees, ornamental shrubbery or similar plants used as ground cover if they do not form a means of spreading fire in natural vegetative growth to any structure.
2. Grass and other vegetation more than fifty (50') from buildings or structures and less than eighteen inches (18") in height above the ground may remain when necessary for soil stabilization and erosion prevention.

#### **5.4.4 Non-Combustible Block Fire and Heat Deflection Walls**

As a last resort option, and if reasonably required, non-combustible fire and heat deflection block walls around the perimeter of buildings can provide a barrier that will mitigate the impact of unmanaged vegetation present outside of the Project site on adjacent undeveloped lands.

The following explanation of the fire protection benefits of non-combustible fire and heat deflection block walls is presented for *informational* purposes *only*.

Non-combustible fire and heat deflection walls provide physical separation of the proposed buildings on two planes:

- horizontal and lateral distance to vegetative fuel beds and
- vertical and non-combustible separation from fuel beds.

Many jurisdictions in California (i.e. – Riverside County, San Bernardino County, and L.A. County) allow using non-combustible walls for radiant and convective heat protection when fully code compliant fuel modification zones are not possible because of site constraints.

When accepted, the walls are placed between the structure and adjacent, down-slope fuels and are usually in alignment with the downslope flow of anticipated Santa Ana wind events.

Non-combustible walls are a voluntary, alternate means of compliance mitigation tool used to protect projects from unusual fire exposure problems where other mitigations maybe inadequate.

Non-combustible fire and heat deflection walls provide a number of fire protection benefits:

#### **1. The walls enhance the effectiveness of built-in fire resistive construction**

The Department of Homeland Security, on its Lessons Learned Information Sharing web-site, has published a case study in which fire resistive block walls contributed to the successful defense of a home in the Ramona area in eastern San Diego County during the 2007 Witch Fire.

There was no fire suppression activity taken by fire department personnel during this incident.

The building was a ranch-style single family dwelling with adobe brick walls, a tiled roof (equivalent to a Class A fire resistive roof), and fire resistive exterior doors and windows. A four foot (4') high adobe wall, approximately thirty (30') from the structure, served as a "fire break".

The Witch Fire burned through the neighborhood on October 21, 2007. Witnesses stated that the flame front and its residual burning in the area lasted for approximately two hours.

The structure did not have enclosed eaves and some of the vegetation and trees in the Defensible Space area were not code compliant. The homeowner found cinders on window sills, evidence that the fire resistive dual-pane windows prevented the fire from entering the structure.

*A neighboring building, without benefit of a fire resistive block wall, and built with similar construction methods, burned to the ground.*

## **2. The walls will remove vegetative fuels from the fire front**

A flame front moving across the sloped landscape adjacent to the developed Project Site will encounter the vertical non-combustible retaining wall, causing a drastic reduction of fuel that carries fire across the ground.

With a sudden lack of available fuel, there will be an immediate reduction of rate of spread and heat production; active and aggressive fire progression will stop and the heat released will be deflected and expended into the atmosphere by micro-climate upslope convective wind patterns.

***Finding:*** Fire resistive perimeter walls are extremely effective when used at the top of slopes where light and moderate fuels are present.

## **3. The non-combustible walls will influence upslope winds and change fire behavior**

The extreme fire behavior produced by high winds bends the flame front over and it can be, at times, traveling parallel to the ground.

The retaining walls, and the lands on the slope next to the walls, are subjected to hours-long solar radiation heating. Upper slope and vertical surfaces will receive more radiant heating than areas at the base of the slopes, thus increasing the ground and fuel temperatures in the upper regions. The differential in temperatures between upper and lower levels of the slope will induce a convective upslope wind pattern, with the atmosphere naturally seeking equilibrium between disparate pressure zones on the slope.

Flame fronts influenced by normal (afternoon southwest wind) wind patterns and Santa Ana wind events (northeast winds) will move across slopes until encountering the

retaining walls. Updrafts from slope convective heating, and a drastic reduction in available fuels, will create a vertical wall of air and wind pressure at the retaining walls that will interrupt normal cross-slope wind influence on fire spread. The upslope winds will have a tendency to push the fire back on itself at the edge of the retaining walls. Up- and cross-slope winds and the fire will seek a travel path offering the least resistance and subsequently move back and away from the vertical walls and into vegetative fuels adjacent to the Project site.



*Illustrative Example of Upslope Winds on Cross-Slope Burning Patterns*

Concrete Masonry Unit block walls are a non-combustible construction material which has excellent fire resistive properties. The fire resistive characteristics of concrete block walls are well established by testing and are a function of the types of aggregates used to manufacture the blocks and their thickness. CMU blocks are manufactured with a blend of aggregate types; this condition is discussed by the ICC and the International Building Code by referencing Standard TMS-216.

#### **FIRE RESISTIVE RATING OF 60% GRAVEL 40% PUMICE AGGREGATE BLEND CMU WALLS**

Nominal Block Width (in.)	Block Cell Treatment	
	Partial Fill Cells	Solid Fill Cells (1)
4	1 hour	1 hour
6	1 hour	4 hours (2)
8	2 hours	4 hours
10	3 hours	4 hours
12	4 hours (2)	4 hours

- (1) – Cells can be filled with grout, loose fill insulation or aggregate meeting ASTM C-33 or C-331 requirements
- (2) – If the aggregate blend is changed to 70-30 to produce a denser architectural unit, the fire rating is decreased to three hours.

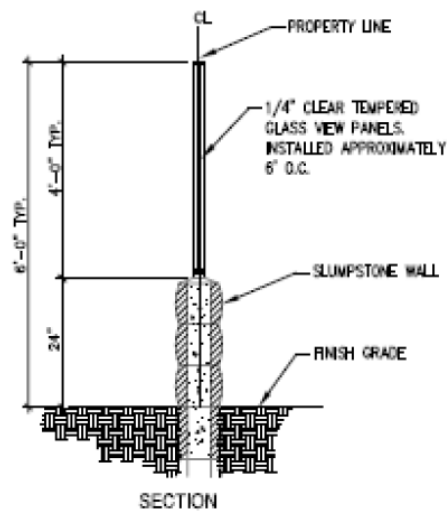
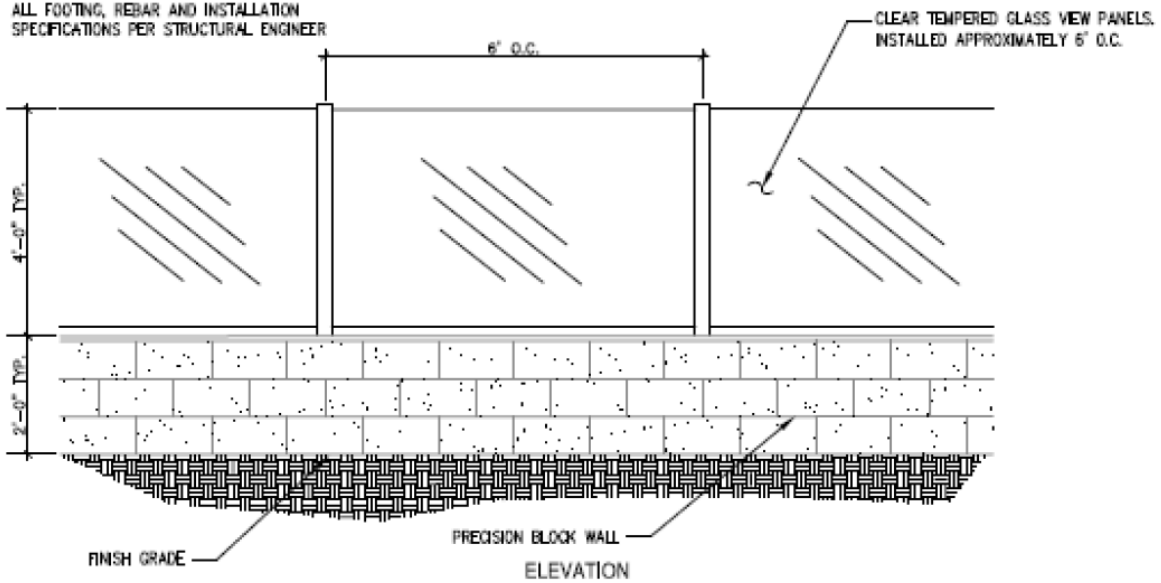
*At minimum, concrete block walls used to protect structures from radiant and convective heat and direct flame contact have a one-hour fire resistive rating.*

For aesthetics and view-scape purposes, an extension of the retaining wall with the installation of fire resistive view panels at the top of the wall could be provided.





ALL FOOTING, REBAR AND INSTALLATION  
SPECIFICATIONS PER STRUCTURAL ENGINEER



## **CHAPTER 6 CONCLUSIONS**

### **6.1 Significant Impacts Mitigated by Fire Protection Plan Requirements**

Due to the severity of impacts from the improper management of wild land areas, the existing laws are stringent and regulate all aspects of wild land fire including building standards, fuel modification, water availability/flow, and access.

#### **6.1.1 Emergency Services**

The project site is served by the San Diego County Fire Authority. The SDFCA is an all-hazard fire protection agency that provides services year-round.

***Finding:*** The fire protection services provided by the SDFCA meets or exceeds the requirements to reduce the Significant Impact of providing adequate emergency services.

The project is zoned Semi-Rural Residential Area, SR-1, property and the majority of the proposed lots are two or more acres.

Maximum fire travel time for SR-1 Land Use Designation for Single Family Dwellings is ten minutes. Estimated travel time, as published by the SDCFA Fire Prevention Office in project documentation, is eight minutes.

***Finding:*** Project documentation and agency recommendations have determined that the project meets the fire department response time requirements for this Significant Impact criteria.

#### **6.1.2 Access and Evacuation**

The primary road (Jamul Highlands Road) providing emergency access and egress exceeds the minimum Fire Code width, paving and slope requirements between the project site and the intersection where two directions of egress travel is available (Lyons Valley Road).

There are no actual or potential bottlenecks or other constraints between the project site and the above referenced intersection.

The private road serving the Project site exceeds the minimum Fire Code width and will meet paving and slope requirements between the cul-de-sac at its western terminus and the intersection of Jamul Highlands Road. Following the recommendations of this Fire Protection Plan, potential bottlenecks or other constraints on the private road serving the Project have been mitigated.

Private roads and driveways will be provided with sufficient width to allow simultaneous passage of civilian vehicles and fire apparatus.

Fire Lanes established under the requirements of this Fire Protection Plan will be maintained in perpetuity according to the requirements of Section 22500.1 of the California Vehicle Code, allowing local law enforcement and fire officials the ability to enforce fire lane regulations without restrictions. When met, the Fire Protection Plan provisions for Access and Evacuation will meet or exceed the Significant Impacts in this category.

**Finding:** When implemented, the Alternate Means of Compliance mitigations recommended by this Fire Protection Plan Project will provide a resolution for the over-length fire access road for proposed parcel sizes. With these implementations, the proposed road enhancement will effectively provide a same practical effect as minimum Code requirements and resolves the requirements for this Significant Impact criteria.

### 6.1.3 – Water Supply

Adequate water supply and distribution services have been provided to the Project Site by the Otay Municipal Water District and by the private installation of on-site water storage tanks with approved fire department connections.

Minimum fire flow for new development projects is 2500 g.p.m. The Otay Municipal Water District indicates on its Project Facility Availability Form that the existing infrastructure will meet the water demand needs of the Project.

**Finding:**

In the ISO Standards Manual, Guide for Determination of Needed Fire Flow, 2006 Edition, buildings closer than forty (40') from each other are considered to have an exposure impact.

Using the formula:  $NFF = C_i (O_i) [1.0 + (X+P)]$

The fire flow for a particular building can be determined, where:

$$C_i = 18F (\sqrt{A})$$

Where F = coefficient of construction (wood frame = 1.5)  
A = effective area

$O_i$  = Occupancy type (C-2 limited combustibility = 0.85)

$X+P$  = 0.126 (exposure coefficient for wood frame building with 30' separation)

For a 2400 square foot wood frame building, the required fire flow is:

$$NFF = C [(18)(1.5)\sqrt{2400}] \times O (.85) \times (1.0 + 0.126)$$
$$NFF = 1191.510195 \text{ gpm}$$

Certain exceptions apply to Needed Fire Flow formula calculations:

- The fire flow calculations only apply to commercial buildings
- The fire flow calculations have limited application to sprinklered building

Thus, while a commercial building within forty (40') of the walls of another commercial building has an exposure problem, the ISO does *not* consider a residential building thirty (30') feet from another residential building as having a similar exposure problem. This can be validated by dropping the construction factor of 0.126 in the exposure portion of the formula, whereby the needed fire flow for a 2400 square foot, fully involved single family residential building becomes 1058 gpm, or a difference of 133 gpm.

***Finding:***

With a non-penalizing exposure distance and exception provided by installation of automatic fire sprinklers, a reduced ISO fire flow requirement for buildings on the Project Site is allowed.

With fire resistive exterior wall construction, a reduced ISO fire flow requirement for buildings on the Project Site is allowed.

The County of San Diego Consolidated Fire Code permits calculation of required fire flow for proposed buildings in Wildland Urban Interface Zones to be calculated using the ISO Fire Flow Determination Formula.

The California Building Code does not consider the less than 70 feet of Zone 2 Defensible Space (FMZ) as a hazardous condition and does not require fire resistive protective over exterior wall openings.

The built-in Ignition Resistant Construction standards mandated by California Building Code Chapter 7-A provide sufficient protection from radiant, convection and direct flame contact heat exposures to prevent direct ignition from exterior exposure to wildfires.

***Conclusion:*** As an Alternate Means of Compliance, the proposed construction features of the buildings and the installation of automatic residential fire sprinklers provide same practical effect mitigation for the reduced fuel modification zone depth and defensible space limit of 100 feet or to the property line, whichever is closer, set by the California Public Resources Code 4291.

***The Water Supply element of Significant Impact criteria has been met by the Project.***

#### **6.1.4 – Ignition Resistant Construction**

All new buildings and structures erected on the project site will be required to meet the County of San Diego Building Code Chapter 7-A requirements for Wildland Urban Interface Areas and California Building Code Chapter 7-A requirements. These requirements mandate the installation of automatic fire sprinkler systems compliant with NFPA Pamphlet 13-D *Installation of Automatic Fire Sprinklers in One and Two Family Dwellings* standards.



## Exterior Wall Openings and Exposure Distance

Table 705.8 of the California Building Code regulates the maximum area of exterior wall openings based on the distance between buildings and the type of protection associated with the wall opening.

All new buildings erected on the Project Site should meet Type V-A Construction. Type V-A wood frame construction corresponds to exterior walls that have a minimum one-hour Fire Resistive rating. One-hour fire resistive exterior walls comply with the California Building Code Chapter 7-A and County of San Diego Enhanced Fire Resistive Building Construction requirements for exterior walls. In addition, all occupiable buildings are required to have automatic residential fire sprinkler systems.

Considering these factors, new single family residences built on the project site will:

- Have automatic fire sprinklers
- Have one-hour Fire Resistive rated construction
- Have a minimum side yard separation distance of thirty (30') feet between structures
- Are allowed to have 100% of allowable openings without restriction or fire resistive protection

TABLE 705.8 MAXIMUM AREA OF EXTERIOR WALL OPENINGS BASED ON FIRE SEPARATION DISTANCE AND DEGREE OF OPENING PROTECTION		
FIRE SEPARATION DISTANCE (feet)	DEGREE OF OPENING PROTECTION	ALLOWABLE AREA <sup>a</sup>
30 or greater	Unprotected, Nonsprinklered (UP, NS)	No Limit
	Unprotected, Sprinklered (UP, S) <sup>d</sup>	Not Required
	Protected (P)	Not Required

## Roof Construction

Roof composition is an important factor in structural survivability. One study shows that typical single family dwellings with non-combustible roofs and thirty-three (33) to sixty-six feet of fuel clearance have a 95% chance of survival (Howard, et.al.,1973). A second study in Santa Barbara counted revealed that houses with a non-combustible roof and thirty-three to sixty feet of vegetation clearance had an 86% chance of survival (Foote, 1994). The proposed single family dwellings in the project will be required to have Class A non-combustible roof decks or assemblies.



The above Power Point slide, from a presentation given by the San Diego County DPLU Fire Marshal's Office, indicates a 96 to 98% survivability rate for buildings erected under Enhanced Fire Resistant Construction/Chapter 7A requirements during actual, extreme fire behavior conditions in similar and more hazardous vegetation types than found on the project site.

***The building standards proposed by this Fire Protection Plan will provide a reasonable degree of ignition resistant buildings at the project site and reduce the Significant Impact caused by less resistive construction standards.***

#### **6.1.5 Defensible Space and Fuel Modifications**

Fire behavior, under these mitigations strategies, is expected to significantly diminish when a wildfire encroaches upon the Fuel Modification Zones on the property line exposed to off-site unmanaged vegetative fuels. Vegetation management beyond a structure's immediate vicinity has little effect on house ignitions unless a minimal break of continuous surface fuels is maintained around the perimeter of the house. For this reason, home site protection includes eliminating continuous ground fuels that lead from wild land fuel beds to the house. This can be accomplished with rock landscaping, cement sidewalk, green grass or by removing dried vegetation and tree needles (Jack Cohen, USFS).

In 1997, Cohen conducted full-scale experiments that revealed that a typical Type V-B combustible exterior residential wall thirty-three feet from a crown fire in 43 foot (13 meter) tall Black Spruce trees. The walls on the test site only ignited when actually touched by flames. These full-scale fire tests are the basis for the 100-foot wide Fuel Modification Zones mandated by the County of San Diego and other fire jurisdictions across the United States.

The test fires produced flame heights of 20 meters or 65.616 feet. Twenty-meter long flame heights are indicative of a 100 megawatt fire.

The off-site Coastal Sage shrub environment on the north, south and west sides of the project will produce a 3.5502631035 megawatt fire. *This heat energy release rate is approximately 3% of the energy produced by Cohen's full scale test fires.*

BEHAVE Fire Modeling indicates that a wild fire moving through Fuel Model 1 or Fuel Model GR-1 native and invasive species annual grasses will produce a Fire Line Intensity of 2868 BTU/foot/second. This value can be anecdotally applied to irrigated lawns and used to determine ignition times for residential construction materials by using various formulas and tables.

For example, using the formula:

$$t_{ig} = \pi kpc (T_{ig} - T_o) / 2q_e \quad (\text{National Fire Academy } Fire \text{ Dynamics pg. 5-3})$$

where

$t_{ig}$  = time to ignition, seconds

$kpc$  = thermal inertia of material

$T_{ig}$  = temperature of ignition source

$T_o$  = surface temperature of exposed material

$q_e$  = incident heat flux to the material

The ignition time of solid materials can be estimated.

For a gypsum-based one-hour fire resistive or non-combustible stucco plaster wall (as required by Chapter 7A of the California Building Code) with a surface temperature of 100 degrees (solar exposure), having a  $kpc$  of  $5.8 \times 10^5 q_e$  (*Fire Dynamics*, pg. 2-15), exposed to radiative heat from a 1400-degree flame front thirty feet (30') away producing 1552 BTUs, ignition time would be **211 minutes or 3.53 hours**.

The BEHAVE Fire Modeling Calculation indicates that non-irrigated Fuel Model 1 and GR-1 light fuels under worst case 2003 Cedar Fire Event burning conditions will produce 2868 BTUs, equivalent to 840.324 watts or **.840324 kilowatts**.

Referring to *Fire Dynamics* Figure 2-5 *Damage Caused by Radiation* below, the calculated fire crossing into the TMP 21255 Project Site from the adjacent properties,

with the potential ignition of landscaped lawns, will not produce sufficient radiant heat to cause significant damage of proposed new single family dwellings.

<b>Damage Description</b>	<b>Heat Flux – kW/m<sup>2</sup></b>
Skin burns	4.7 to 5.0
Pain threshold	1.5
Pain at one minute	2.1
Plastic melts	12.0
Cable insulation degrades	18.0 to 20.0
<b><i>Piloted ignition occurs:</i></b>	
<b>Wood</b>	<b>14.6</b>
<b>Painted Wood</b>	<b>16.7</b>
<b>Wood spontaneously ignites</b>	<b>33.5</b>

<b>Type of Heat Exposure</b>	<b>Heat Flux Value</b>
Flame Radiation	0-200 kW/m <sup>2</sup>
Flame Convection	10-20 kW/m <sup>2</sup>
Hot Gas Convection	0-10 kW/m <sup>2</sup>
Hot Gas Radiation	0-150 kW/m <sup>2</sup>

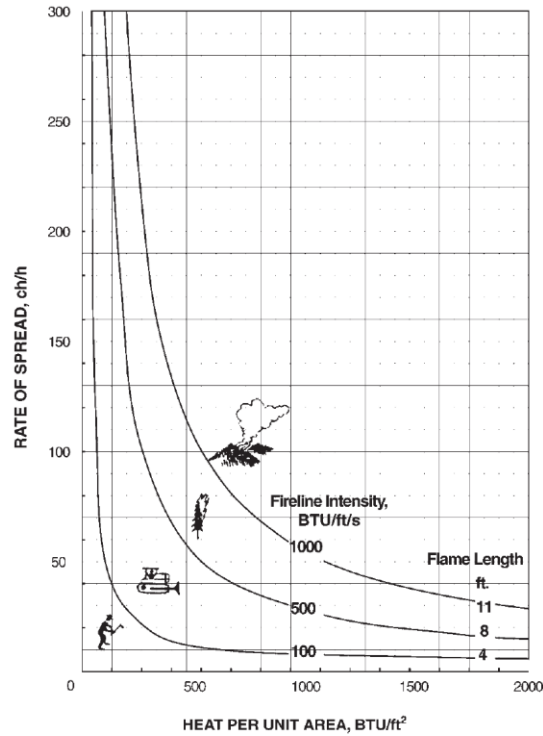
*Table 5.5 Heat Flux **Direct Contact** Values, NFA Fire Dynamics*

While Fuel Model SH-7 (Coastal Sage shrub) vegetation produces relatively long flame lengths (38') and higher burning intensities (2955 BTU/sq.ft.) as compared to grassy fuels, fire behavior will change when the flame front transitions into an irrigated grass fuel bed. Irrigated lawns, as proposed as part of the defensible space guidelines for the project, will have a fuel moisture content of at least 120%.

Fuel moisture contents of 120% result in green, non-cured vegetation, with all herbaceous materials remaining in the "live" fuel categories. As a result, grassy fuels with high fuel moistures will produce flame lengths of one (1') or less and have a rate of spread of approximately 5 chains (330 feet) **per hour** when exposed to a 20 m.p.h. mid-flame wind.

The fire behavior characteristics of irrigated grass fuels is well within the capabilities of fire suppression forces using non-mechanized firefighting tools to control fires in this vegetation type. The change of burning characteristics and intensity as fire moves across the grassy fuels will provide more opportunities for responding resources to take defensive suppression action at the established Fuel Modification Zones around the TPM 21255 structures (see the Fire Behavior Characteristics Chart below).





### **Conclusion:**

This fire protection plan demonstrates compliance or alternate means of compliance with the applicable regulations and standards for buildings constructed in Wildland Urban Interface or Very High Fire Severity Areas. It will ensure adequate compliance with codes/regulations and significance standards, including required fuel modifications and construction resistive materials. In addition, it can be incorporated by reference into the project's Final Conditions of Approval and enforced through each proposed structure's Certificate of Occupancy Conditions.

**CHAPTER 7**  
**LIST OF PREPARERS AND PERSONS AND ORGANIZATIONS**  
**CONTACTED**

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Otay Municipal Water District

## CHAPTER 8 REFERENCES AND APPENDIXES

### APPENDIX A COUNTY OF SAN DIEGO APPROVED PLANT LISTS

#### SUGGESTED PLANT LIST FOR A DEFENSIBLE SPACE

BOTANICAL NAME	COMMON NAME	Climate Zone
<b>TREES</b>		
Acer		
platanoides	Norway Maple	M
rubrum	Red Maple	M
saccharinum	Silver Maple	M
saccharum	Sugar Maple	M
macrophyllum	Big Leaf Maple	C/ (R)
Alnus rhombifolia	White Alder	C/I/M (R)
Arbutus		
unedo	Strawberry Tree	All zones
Archontophoenix		
cunninghamiana	King Palm	C
Arctostaphylos spp.**	Manzanita	C/I/D
Brahea		
armata	Blue Hesper Palm	C/D
edulis	Guadalupe Palm	C/D
Ceratonia siliqua	Carob	C/I/D
Cercidium floridum	Blue Palo Verde	D
Cercis occidentalis**	Western Redbud	C/I/M
Cornus		
nuttallii	Mountain Dogwood	I/M
stolonifera	Redtwig Dogwood	I/M
Eriobotrya		C/I/D
japonica	Loquat	C
Erythrina caffra	Kaffirboom Coral Tree	I/M
Ginkgo biloba "Fairmount"	Fairmount Maidenhair Tree	I/D/M
Gleditsia triacanthos	Honey Locust	
Juglans		I
californica	California Walnut	C/I
hindsii	California Black Walnut	I/D/M
Lagerstroemia indica	Crape Myrtle	I
Ligustrum lucidum	Glossy Privet	C/I/M
Liquidambar styraciflua	Sweet Gum	I
Liriodendron tulipifera	Tulip Tree	
Lyonothamnus floribundus		C
ssp. Asplenifolius	Fernleaf Catalina Ironwood	C/I/D
Melaleuca spp.	Melaleuca	C/I
Parkinsonia aculeate	Mexican Palo Verde	
Pistacia		
chinensis	Chinese Pistache Pistachio Nut	C/I/D

vera	Pistachio Nut	I
Pittosporum		
phillyraeoides	Willow Pittosporum	C/I/D
viridiflorum	Cape Pittosporum	C/I
Platanus		
acerifolia	London Plane Tree	All zones
racemosa**	California Sycamore	C/I/M
Populus		
alba	White Poplar	D/M
fremontii**	Western Cottonwood	I
trichocarpa	Black Cottonwood	I/M
Prunus		
xblireiana	Flowering Plum	M
caroliniana	Carolina Laurel Cherry	C
ilicifolia**	Hollyleaf Cherry	C
lyonii**	Catalina Cherry	C
serrulata 'Kwanzan'	Flowering Cherry	M
yedoensis 'Akebono'	Akebono Flowering Cherry	M
Quercus		
agrifolia**	Coast Live Oak	C/I
engelmannii	Engelmann Oak	I
**  suber	Cork Oak	C/I/D
Rhus		
lancea**	African Sumac	C/I/D
Salix spp.**	Willow	All zones (R)
Tristania conferta	Brisbane Box	C/I
Ulmus		
parvifolia	Chinese Elm	I/D
pumila	Siberian Elm	C/M
Umbellularia californica**	California Bay Laurel	C/I



SHRUBS		
Agave	Century Plant	D
americana	Century Plant	D
deserti	Shawis Century Plant	D
shawii**		
Amorpha fruticosa**	False Indigobush	I
Arbutus		
menziesii**	Madrone	C/I
Arctostaphylos spp.**	Manzanita	C/I/D
Atriplex**		
canescens	Hoary Saltbush	I
lentiformis	Quail Saltbush	D
Baccharis**		
glutinosa	Mule Fat	C/I
pilularis	Coyote Bush	C/I/D
Carissa grandiflora	Natal Plum	C/I
Ceanothus spp.**	California Lilac	C/I/M
Cistus spp.	Rockrose	C/I/D
Cneoridium dumosum**	Bushrue	C
Comarostaphylis**		
diversifolia	Summer Holly	C
Convolvulus cneorum	Bush Morning Glory	C/I/M
Dalea		
orcuttii	Orcutt's Delea	D
spinosa**	Smoke Tree	I/D
Elaeagnus		
pungens	Silverberry	C/I/M
Encelia**		
californica	Coast Sunflower	C/I
farinose	White Brittlebush	D/I
Eriobotrya		
deflexa	Bronze Loquat	C/I
Eriophyllum		
confertiflorum**	Golden Yarrow	C/I
staechadifolium	Lizard Tail	C
Escallonia spp.	Escallonia	C/I
Feijoa sellowiana	Pineapple Guava	C/I/D
Fouquieria splendens	Ocotillo	D
Fremontodendron**		
californicum	Flannelbush	I/M
mexicanum	Southern Flannelbush	I
Galvezia		
juncea	Baja Bush-Snapdragon	C
speciosa	Island Bush-Snapdragon	C
Garrya		
elliptica	Coast Silktassel	C/I
flavescens**	Ashy Silktassel	I/M

Salvia spp.**	California Wild Rose	C/I
Sambucus spp.**	Baja California Wild Rose	C/I
Symphoricarpos mollis**	Sage	All Zones
Syringa vulgaris	Elderberry	C/I/M
Tecomaria capensis	Creeping Snowberry	C/I
Teucrium fruticans	Lilac	M
Toxicodendron**	Cape Honeysuckle	C/I/D
diversilobum	Bush Germander	C/I
Verbena		
lilacina	Poison Oak	I/M
Xylosma congestum		
Yucca**	Lilac Verbena	C
schidigera	Shiny Xylosma	C/I
whipplei		
	Mojave Yucca	D
	Foothill Yucca	I

<b>VINES</b>		
Antigonon leptopus	San Miguel Coral Vine	C/I
Distictis buccinatoria	Blood-Red Trumpet Vine	C/I/D
Keckiella cordifolia**	Heart-Leaved Penstemon	C/I
Lonicera		
japonica 'Halliana'	Hall's Honeysuckle	All Zones
subspicata**	Chaparral Honeysuckle	C/I
Solanum		
jasminoides	Potato Vine	C/I/D

<b>PERENNIALS</b>		
Coreopsis		
gigantea	Giant Coreopsis	C
grandiflora	Coreopsis	All Zones
maritima	Sea Dahlia	C
verticillata	Coreopsis	C/I
Heuchera maxima	Island Coral Bells	C/I
Iris douglasiana**	Douglas Iris	C/M
Iva hayesiana**	Poverty Weed	C/I
Kniphofia uvaria	Red-Hot Poker	C/M
Lavandula spp.	Lavender	All Zones
Limonium californicum		
var. mexicanum	Coastal Statice	C
perezii	Sea Lavender	C/I
Oenothera spp.	Primrose	C/I/M
Penstemon spp.**	Penstemon	C/I/D
Satureja douglasii	Yerba Buena	C/I
Sisyrinchium		
bellum	Blue-Eyed Grass	C/I
californicum	Golden-Eyed Grass	C
Solanum		
xanthii	Purple Nightshade	C/I
Zauschneria**		
californica	California Fuschia	C/I
cana	Hoary California Fuschia	C/I
'Catalina'	Catalina Fuschia	C/I

<b>ANNUALS</b>		
Lupinus spp.**	Lupine	C/I/M

### UNDESIRABLE PLANT LIST

The following species are highly flammable and should be avoided when planting within the first 50 feet adjacent to a structure. The plants listed below are more susceptible to burning, due to rough or peeling bark, production of large amounts of litter, vegetation that contains oils, resin, wax, or pitch, large amounts of dead material in the plant, or plantings with a high dead to live fuel ratio. Many of these species, if existing on the property and adequately maintained (pruning, thinning, irrigation, litter removal, and weeding), may remain as long as the potential for spreading a fire has been reduced or eliminated.

<b><u>BOTANICAL NAME</u></b>	<b><u>COMMON NAME</u></b>
<u>Abies species</u>	Fir Trees
<u>Acacia species</u>	Acacia (trees, shrubs, groundcovers)
<u>Adenostoma sparsifolium**</u>	Red Shanks
<u>Adenostoma fasciculatum**</u>	Chamise
<u>Agonis juniperina</u>	Juniper Myrtle
<u>Araucaria species</u>	Monkey Puzzle, Norfolk Island Pine
<u>Artemesia californica**</u>	California Sagebrush
<u>Bambusa species</u>	Bamboo
<u>Cedrus species</u>	Cedar
<u>Chamaecyparis species</u>	False Cypress
<u>Coprosma pumila</u>	Prostrate Coprosma
<u>Cryptomeria japonica</u>	Japanese Cryptomeria
<u>Cupressocyparis leylandii</u>	Leylandii Cypress
<u>Cupressus forbesii**</u>	Tecate Cypress
<u>Cupressus glabra</u>	Arizona Cypress
<u>Cupressus sempervirens</u>	Italian Cypress
<u>Dodonea viscosa</u>	Hopseed Bush
<u>Eriogonum fasciculatum**</u>	Common Buckwheat
<u>Eucalyptus species</u>	Eucalyptus
<u>Heterotheca grandiflora**</u>	Telegraph Plant
<u>Juniperus species</u>	Junipers
<u>Larix species</u>	Larch
<u>Lonicera japonica</u>	Japanese Honeysuckle
<u>Miscanthus species</u>	Eulalia Grass
<u>Muehlenbergia species**</u>	Deer Grass
<u>Palmae species</u>	Palms
<u>Picea species</u>	Spruce Trees
<u>Pickeringia Montana**</u>	Chaparral Pea
<u>Pinus species</u>	Pines
<u>Podocarpus species</u>	Fern Pine
<u>Pseudotsuga menziesii</u>	Douglas Fir
<u>Rosmarinus species</u>	Rosemary
<u>Salvia mellifera**</u>	Black Sage
<u>Taxodium species</u>	Cypress
<u>Taxus species</u>	Yew
<u>Thuja species</u>	Arborvitae
<u>Tsuga species</u>	Hemlock
<u>Urtica urens**</u>	Burning Nettle



## **APPENDIX B**

### **ACCESS ROAD REQUIREMENTS**

All roadways serving this Project shall be a minimum of twenty-six (26) feet improved paved width. Private driveways shall have a minimum improved paved width of sixteen (16') feet.

All roads and driveways shall not exceed 20% grades. Any road or driveway between 15 and 20 percent will be a concrete surface and have a deep broom finish perpendicular to the direction of travel to enhance traction.

All dead-end roads (including driveways) in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus.

All roads within the development shall be all-weather paved streets capable of supporting fire apparatus weighing up to 75,000 pounds.

All roads shall be provided with the approved paved driving surface prior to construction and/or bringing combustible building products onto each parcel.

Gates Across Roads - Currently, there are no entrance gates planned for this residential development. If in the future if gates are proposed the following shall be required:

- Gates shall **not** be placed across the main private road serving the Project site.
- Gates across individual driveways shall be automatic
- Gates shall be equipped with approved emergency key-operated switches that overrides all gate command functions and opens the gate(s).
- Gates may be equipped with approved emergency tract control-activating strobe light sensor(s) or other devices approved by the San Diego County Fire Authority Chief, which will activate the gate on the approach of emergency apparatus.
- Gate opening mechanisms shall be provided with battery back-up or manual mechanical disconnects in the event of power failures.
- Gates shall conform to San Diego County Fire Authority requirements and County design requirements DS-17, 18, and 19.

Roads having improved paved width less than thirty-six (36') feet shall be designated Fire Apparatus Access Roads (Fire Lanes). Fire Lanes shall be identified by:

- Red curbs with white stenciled letters plainly visible from a vehicle
- White stenciled letters on red curbs shall state "Fire Lane-No Parking" Fire Lane signs posted in compliance with Section 22500.1 of the California Vehicle Code

## **APPENDIX C**

### **IGNITION RESISTANT CONSTRUCTION & FIRE PROTECTION SYSTEMS**

Several precautionary ignition-resistant construction measures will be used to reduce potential ignition of residences from wild land fires firebrands.

All structures shall be built with Class A Roof Assemblies, including a Class A roof covering.

The exterior wall surface materials shall be non-combustible, or an approved alternate, and shall be protected by two inch nominal solid blocking between rafters all roof overhangs or by stucco boxed-in eaves.

Attic or foundation ventilation louvers or ventilation openings shall not exceed 144 square inches per opening and shall be covered with 1/4-inch mesh corrosion-resistant metal screening or other approved material that offers equivalent protection. Attic ventilation shall also comply with the requirements of the California Building Code (C.B.C.). Attic ventilation openings or ventilation louvers in soffits, eave overhangs, between rafters at eaves, or in other overhanging areas shall not be permitted.

Paper-faced insulation shall be prohibited in attics or ventilated spaces.

All chimney, flue or stovepipe openings will have an approved spark arrester. Spark arrestors shall be installed to be visible for the purposes of inspection and maintenance.

Glass or other transparent, translucent or opaque glazing, including skylights, shall be constructed of tempered glass or multi-layered panels with at least one tempered pane or glass block construction. Exterior glazing shall have a minimum fire-resistance rating of not less than 20 minutes.

All residential structures will have automatic interior fire sprinklers installed according to the National Fire Protection Association (NFPA) 13D-*Standard for the Installation of Automatic Fire Sprinklers in One- and Two-family Homes and Manufactured Homes* and SDCFA standards.

Rain gutters, down spouts and gutter hardware will be constructed from metal or other approved non-combustible material. Gutters will be designed to reduce the accumulation of leaf litter and debris.

The first five feet of fences and other construction (gates, gate posts, fence posts) attached to structures shall be of non-combustible material.

All projections (patio covers, unenclosed roofs and floors, and similar architectural appendages and projections) will be of non-combustible construction, one-hour fire resistive construction on the underside, or heavy timber construction. When such

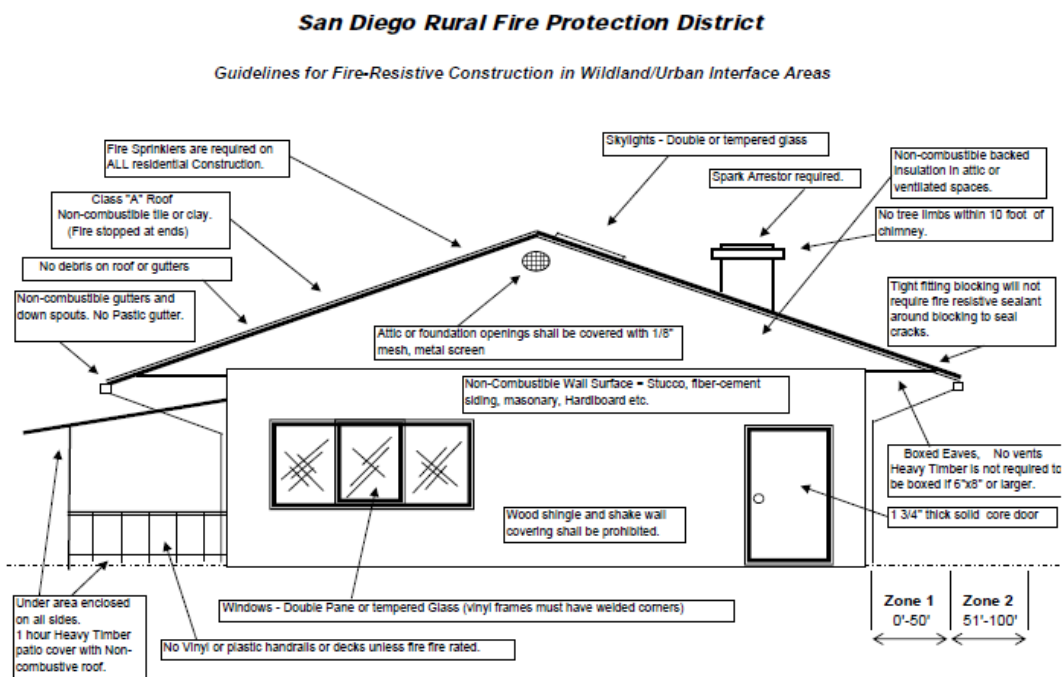
appendages and projections are attached to exterior fire-resistive walls, they will be constructed to maintain the fire-resistive integrity of the wall.

Exterior balconies and decks will be of non-combustible construction, one-hour fire resistive construction on the underside, or heavy timber construction. Exterior decks shall be completely enclosed from the bottom of the deck surface to ground level and covered with approved non-combustible construction materials.

Exterior doors will be approved non-combustible construction, solid core wood not less than 1-3/8 inches thick (or equivalent) and have a fire resistive rating of not less than 20 minutes.

All windows will be provided with 1/8 inch metal mesh or similar non-combustible screens to prevent embers from entering the structure during high wind conditions.

Any damaged or replacement window, siding, roof coverings, and other mitigation measures will meet or exceed the original intent of the fire protection discussed in this Plan.



**ZONE 1** = This zone includes the area from any building to point 50 feet away. This zone must be cleared and planted with fire resistive plants.  
**ZONE 2** = This zone is between 51 to 100 feet from building. In this zone the native vegetation may remain but it must be thinned by 50% and all dead and dying vegetation must be removed. (Fuel Modification) The modification of the vegetation will slow down fire spread

## **APPENDIX D DEFENSIBLE SPACE AND VEGETATION MANAGEMENT**

### **Additional Zone 1 Fuel Modification Requirements**

All undesirable non-native vegetation (See APPENDIX A) will be removed and replanted with drought tolerant, fire resistant landscaping.

Vegetation may include single or cluster of trimmed fire resistant native and ornamental plants (oaks, sumac, toyon; SEE APPENDIX A.)

Dense plant masses adjacent to the structures and at bases of trees and tree clusters will not be placed in this Zone. Provide low growing, fire resistive, deep rooted, drought tolerant planting to maintain erosion control and soil stability, especially on manufactured slopes.

Native or ornamental trees to be retained within fuel modification zones shall be pruned to maintain a vertical separation of approximately ten (10) feet above underlying shrubs or groundcover. Pruning of the shrubs will minimize the impact of the tree pruning.

Trees and large shrubs over 15 feet in height (oaks, sumac, toyon, etc.) shall be pruned to provide clearance between plants of three (3) times the height of understory plants, or 10 feet, whichever is greater.

Trees may be planted and maintained as individual specimens, or clustered with no more than three (3) trees in a single cluster with a minimum distance between mature canopies of 20 feet. Avoid planting trees directly uphill of one another.

Tree canopies will not be allowed to overhang the roof of any structure; the outer edge of the canopies of mature trees will be a minimum of ten (10) feet from the building eaves, and free of all dead or dying parts.

All the dead material must be pruned out of all vegetation on an annual and as- needed basis by June 1<sup>st</sup> of each year.

Mature heights of new shrub plantings will be a maximum of 36 inches.

Zone 1 Defensible Space is an irrigated landscaping zone. This zone may be irrigated with micro-irrigation when overhead irrigation may cause erosion.

Firewood and combustible material shall not be stored within thirty (30') of buildings and structures, under unenclosed spaces beneath buildings or structures, or on decks or under eaves, canopies or other projections or overhangs.



Highly flammable plant species will be permanently removed from Zone 1 Defensible Space because of their susceptibility to wild land fire. Additionally, certain ornamental plants shall not be planted or allowed to become established within the Zone 1 Defensible Space unless otherwise specified as acceptable in the Recommended Plant List in Appendix A or as approved by the Fire Marshal.

### **Additional Zone 2 Fuel Modification Requirements**

If shrubs are located underneath a tree's drip line, the lowest branch shall be at least three times as high as the under story shrubs or 10 feet, whichever is greater.

Large continuous masses of shrubs and understory less than 15 feet in height will be thinned to remove fuel and provide at least ten (10) feet between shrub masses, or individual shrubs. Thinning will reduce the overall canopy coverage of the area a minimum of fifty (50) percent.

Mulches, chips and other small multi-cuttings (cut to less than two inches in diameter and four inches in length) will only be evenly spread over the area no more than 6 inches at least 50 feet from structures. This can be used to prevent grass and weed encroachments within the treated areas. Mulching helps to maintain soil moisture for designated plants, reduces the growth of annual grasses, and minimizes soil erosion.

There is a very high probability that the openings will be dominated with non-native weed or grass species. Therefore, all grasses and weeds are to be mowed or weed-whipped to a four (4) inch stubble height by June 1<sup>st</sup> of each year or when the fuels become cured, whichever occurs first. Any vegetation biomass (debris and trimmings) produced by thinning and pruning shall be removed from the site or converted to mulch by chipping and evenly distributed to a maximum depth of four (4) inches and at kept at least 50 feet from a structure.

### **Additional General Fuel Modification Measures**

Brush removal shall be completed prior to commencing any flammable construction.

During construction at least 50 feet of clearance around the structures shall be free of all flammable vegetation as an interim fuel modification zone.

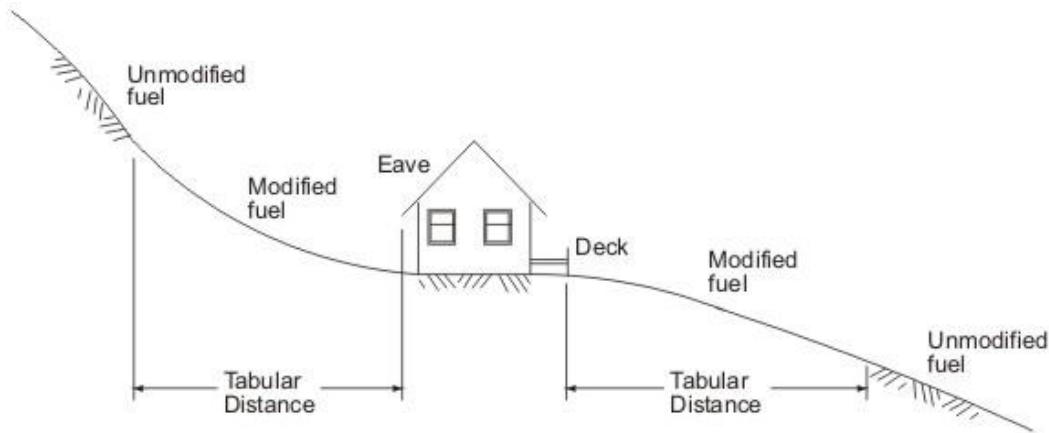
The annual completion of all designated Fuel Modification Treatments will occur prior to June 15<sup>th</sup>.

All individual landscaping plans, including additional structures, will comply with the Fire Protection Plan.

Trees and plants will be planted in accordance with the County of San Diego Approved

Plants for Defensible Space in Fire Prone Areas List or as approved by the SDFCA.

Any disputes of yard landscaping regarding the interpretation of this Fire Protection Plan (FPP) will be decided by the SDFCA Fire Marshal. The Fire Marshal's decision will be final and binding on the landowner.



Example of Fuel Modification Zone configuration for 100' depth between structure and unmodified fuel – “tabular distance” is the required lateral distance, without regard to distances produced by slope inclination or declination, from the edge of buildings to the unmanaged vegetative fuel bed.

## **APPENDIX E**

### **RESIDENTIAL SOLAR SYSTEMS**

The County of San Diego routinely requires new land development to provide a minimum of 10% of the roof surface area with permanently installed residential solar panel systems.

The following provides basic information about the impact of solar panel system installations and how they potentially impact Fire Department operations and safety.

#### **System Identification Markings**

PV systems must be provided with identification marking systems. Marking provides emergency responders with appropriate warning and guidance about working around and isolating the solar electric system. Materials used for marking the system components must be weather resistant.

Locations or equipment to be identified:

- Main Service Disconnect
- Direct Current Conduit
- Raceways
- Enclosures
- Cable Assemblies
- Junction Boxes

Marking should be placed on all interior and exterior DC conduit, raceways, enclosures, and cable assemblies, every 10 feet, at turns and above and/or below penetrations and all DC combiner and junction boxes.

#### **Access, Pathways and Smoke Ventilation**

Access and spacing requirements should be observed in order to:

- Ensure access to the roof
- Provide pathways to specific areas of the roof
- Provide for smoke ventilation opportunities area
- Provide emergency egress from the roof

Roof access points are defined as areas:

- where ladders are not placed over window or door openings
- located at strong points of building construction
- locations where there are no conflicts with overhead obstructions

## **Residential Systems—Single and Two-Unit Residential Dwellings**

### **Access/Pathways**

- a. Residential Buildings with hip roof layouts: Modules should be located in a manner that provides one (1) three-foot (3') wide clear access pathway from the eave to the ridge on each roof slope where modules are located. The access pathway should be located at a structurally strong location on the building (such as a bearing wall).
- b. Residential Buildings with a single ridge: Modules should be located in a manner that provides two (2) three-foot (3') wide access pathways from the eave to the ridge on each roof slope where modules are located.
- c. Hips and Valleys: Modules should be located no closer than one and one half (1.5) feet to a hip or a valley if modules are to be placed on both sides of a hip or valley. If the modules are to be located on only one side of a hip or valley that is of equal length, then the modules may be placed directly adjacent to the hip or valley.

### **Smoke Ventilation**

The modules should be located no higher than three feet (3') below the ridge.



## APPENDIX F BEHAVE FIRE MODELING CALCULATIONS



BehavePlus 5.0.5

Tue, Sep 05, 2017 at 07:02:56

Page 1

### Inputs: SURFACE, SIZE, SPOT, IGNITE

Description ➡ Jamul Highlands

### Fuel/Vegetation, Surface/Understory

Fuel Model ➡ sh7

### Fuel/Vegetation, Overstory

Downwind Canopy Height ft ➡ 9

### Fuel Moisture

1-h Moisture % ➡ 1

10-h Moisture % ➡ 3

100-h Moisture % ➡ 5

Live Herbaceous Moisture % ➡ 30

Live Woody Moisture % ➡ 50

### Weather

20-ft Wind Speed (upslope) mi/h ➡ 30

Wind Adjustment Factor ➡ .5

Air Temperature oF ➡ 85

Fuel Shading from the Sun % ➡ 0

### Terrain

Slope Steepness % ➡ 13

Ridge-to-Valley Elevation Difference ft ➡ 100

Ridge-to-Valley Horizontal Distance mi ➡ .15

Spotting Source Location ➡ VB

### Fire

Elapsed Time h ➡ 1

### Run Option Notes

Maximum reliable effective wind speed limit IS imposed [SURFACE].

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always  
for the direction of the spread calculations [SURFACE].

Wind is blowing upslope [SURFACE].

### Output Variables

Surface Rate of Spread (maximum) (ch/h) [SURFACE]

Heat per Unit Area (Btu/ft<sup>2</sup>) [SURFACE]  
(continued on next page)



### Jamul Highlands

Surface Rate of Spread (maximum)	277.3	ch/h
Heat per Unit Area	2955	Btu/ft <sup>2</sup>
Fireline Intensity	15023	Btu/ft/s
Flame Length	37.5	ft
Reaction Intensity	9488	Btu/ft <sup>2</sup> /min
Area	1294.4	ac
Perimeter	591	ch
Spot Dist from a Wind Driven Surface Fire	1.5	mi
Probability of Ignition from a Firebrand	100	%

# APPENDIX G

## SAN DIEGO COUNTY FIRE AUTHORITY

### FORM 399-F AND PROJECT CONDITIONS



#### County of San Diego, Planning & Development Services PROJECT FACILITY AVAILABILITY - FIRE ZONING DIVISION

Please type or use pen		F								
William Roetzheim 619-917-4917 Owner's Name Phone 13518 Jamul Drive Owner's Mailing Address Street Jamul CA 91935 City State Zip		ORG _____ ACCT _____ ACT _____ TASK _____ DATE _____ AMT \$ _____ DISTRICT CASHIER'S USE ONLY								
SECTION 1. PROJECT DESCRIPTION TO BE COMPLETED BY APPLICANT										
A. <input type="checkbox"/> Major Subdivision (TM) <input type="checkbox"/> Specific Plan or Specific Plan Amendment <input checked="" type="checkbox"/> Minor Subdivision (TPM) <input type="checkbox"/> Certificate of Compliance: _____ <input type="checkbox"/> Boundary Adjustment <input type="checkbox"/> Rezone (Reclassification) from _____ to _____ zone. <input type="checkbox"/> Major Use Permit (MUP), purpose: _____ <input type="checkbox"/> Time Extension, Case No. _____ <input type="checkbox"/> Expired Map, Case No. _____ <input type="checkbox"/> Other: _____ B. <input checked="" type="checkbox"/> Residential ..... Total number of dwelling units 4 <input type="checkbox"/> Commercial ..... Gross floor area _____ <input type="checkbox"/> Industrial ..... Gross floor area _____ <input type="checkbox"/> Other ..... Gross floor area _____ C. Total Project acreage 10.5 Total lots 4 Smallest proposed lot _____		Assessor's Parcel Number(s) (Add extra if necessary) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">596-152-04-00</td> <td style="width: 50%;"></td> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table> Thomas Guide, Page 1273 Grid B-7 Jamul Highlands Road Project address Street Jamul - Delzura 91935 Community Planning Area/Subregion Zip	596-152-04-00							
596-152-04-00										
OWNER/APPLICANT AGREES TO COMPLETE ALL CONDITIONS REQUIRED BY THE DISTRICT. Applicant's Signature: <u>X [Signature]</u> Date: <u>3/30/2017</u> Address: 13518 Jamul Drive, Jamul, CA 91935 Phone: 619-917-4917 (On completion of above, present to the district that provides fire protection to complete Section 2 and 3 below.)										
SECTION 2: FACILITY AVAILABILITY TO BE COMPLETED BY DISTRICT										
District Name: <u>San Diego County Fire Authority</u> Indicate the location and distance of the primary fire station that will serve the proposed project. <u>FS 36, 14024 Penicillin Valley Ranch Rd., 4.0 miles</u>										
A. <input checked="" type="checkbox"/> Project is in the District and eligible for service. <input type="checkbox"/> Project is not in the District but is within its Sphere of Influence boundary, owner must apply for annexation. <input type="checkbox"/> Project is not in the District and not within its Sphere of Influence boundary. <input type="checkbox"/> Project is not located entirely within the District and a potential boundary issue exists with the _____ District. B. <input checked="" type="checkbox"/> Based on the capacity and capability of the District's existing and planned facilities, fire protection facilities are currently adequate or will be adequate to serve the proposed project. The expected emergency travel time to the proposed project is <u>7.45</u> minutes. <u># Project to annex into CFD 04-1.</u> <input type="checkbox"/> Fire protection facilities are not expected to be adequate to serve the proposed development within the next five years. C. <input checked="" type="checkbox"/> District conditions are attached. Number of sheets attached: <u>3</u> <input type="checkbox"/> District will submit conditions at a later date.										
SECTION 3. FUELBREAK REQUIREMENTS										
Note: The fuelbreak requirements prescribed by the fire district for the proposed project do not authorize any clearing prior to project approval by Planning & Development Services.										
<input checked="" type="checkbox"/> Within the proposed project <u>100</u> feet of clearing will be required around all structures. <input type="checkbox"/> The proposed project is located in a hazardous wildland fire area, and additional fuelbreak requirements may apply. Environmental mitigation requirements should be coordinated with the fire district to ensure that these requirements will not pose fire hazards.										
This Project Facility Availability Form is valid until final discretionary action is taken pursuant to the application for the proposed project or until it is withdrawn, unless a shorter expiration date is otherwise noted.										
[Signature] JAMES PINE, DFM Authorized Signature Print Name and Title		658.495.5434 5/3/17 Phone Date								
On completion of Section 2 and 3 by the District, applicant is to submit this form with application to: Planning & Development Services - Zoning Counter, 5510 Overland Ave, Suite 110, San Diego, CA 92123										



PDS-399F (Rev. 09/21/2012)



## County of San Diego

HERMAN REDDICK  
PROGRAM MANAGER  
(858) 974-5999  
FAX (858) 487-9882

Public Safety Group  
San Diego County Fire Authority  
5510 Overland Ave, Suite 250, San Diego, CA 92123-1239  
www.sdcounityfire.org

SUSAN QUASARANO  
PROGRAM COORDINATOR  
(858) 974-5924  
FAX (858) 487-9882

May 3, 2017

William Roetzeim  
13518 Jamul Dr.  
Jamul, CA 91935

Ref: **Project Facility Availability Form (399F)**  
**APN 596-152-04**

Following are the County Fire Marshal's Office comments in response to a request for a Project Facility Availability Form and are preliminary in nature.

### ***FIRE ACCESS ROADWAYS - Road design***

1. Fire access roadways are required from building pads to a public way. The fire access roadway (including driveways) shall be extended to within 150 feet of acceptable fire fighter/ hose/line access to all ground level exterior portions of proposed buildings.
2. Fire apparatus access roadways shall have an unobstructed, improved width of not less than 24 feet (not less than 16 feet if serving not more than two dwellings), all-weather, designed and maintained to support the imposed load of fire apparatus (not less than 75,000 lbs).
3. Fire access roadways and driveways shall not exceed 20% grade.
4. A vertical clearance of not less than 13 feet 6 inches shall be maintained.
5. No construction involving combustible materials on the subject property can take place until fire access roads are installed and fully meet code requirements. (Exception: If prearranged with the fire authority having jurisdiction, asphalt paving may be installed with the exception of the final lift, which may be postponed until just before building final if desired for roadway cosmetic purposes.)
6. All new public roads, all private roads within major subdivisions, and all private road easements serving four or more parcels shall be named. Standard street name signs complying with DPW Design Standard DS#13 shall be provided at each intersection. Signs shall display both street names.

***FIRE ACCESS ROADWAYS - Turnarounds***

Dead-end fire apparatus roads more than 150 feet in length, including private driveways, shall be provided with approved means for turning the fire apparatus around. Turn-arounds must not be used for parking of vehicles, or otherwise obstructed.

***FIRE ACCESS ROADWAYS – Maintenance***

Ownership of roads (except individual driveways) must be such that all property owners within the project share in legal and fiscal responsibility for maintaining such roads in compliance with fire codes, both those codes currently in effect, and future code changes. The obligation must be legally binding on property owners and convey with ownership transfer.

***BUILDING PAD LOCATION ON LOT***

Structures, including projections, shall be located not less than 30 feet away from property lines, measured perpendicular to the subject property line.

***FUEL MODIFICATION ZONE***

1. A fuel modification zone of not less than 100-foot is required around all structures, in accordance with the specification of County Fire Code §96.1.4907.2.
2. The fuel modification zone must be established and maintained by thinning, clearing away or modifying combustible vegetation within the zone. The fuel modification zone may be re-planted with either approved irrigated, fire-resistant planting material or approved non-irrigated, drought-tolerant, fire-resistant plant material. Re-planting with approved plant material may be required for erosion control.  
EXCEPTIONS:
  - a) Single specimens of trees, ornamental shrubbery or similar plants used as ground covers, provided that they do not form a means of rapidly transmitting fire from the native growth to any structure.
  - b) Grass and other vegetation located more than 50 feet from buildings or structures and less than 18 inches in height above the ground need not be removed where necessary to stabilize the soil and prevent erosion.
3. This does NOT authorize clearing beyond property line without legal rights.

***FIRE PROTECTION – Fire Protection Plan***

A Fire Protection Plan, prepared by a PDS-approved consultant, shall be provided and be formatted per the County of San Diego Guidelines for Determining Significance and Report Format and Content Requirements—Wildland Fire and Fire Protection.



***FIRE PROTECTION – Automatic fire sprinklers***

New residential structures and attached garages shall be equipped with fire sprinklers to NFPA 13D and County of San Diego standards. All new accessory buildings greater than 500 square feet shall be equipped with fire sprinklers designed and installed to the appropriate NFPA standard. Any existing structure for which a building permit must be obtained may be required to have an automatic fire sprinkler system installed.

***BUILDING PLAN REVIEW (informational only)***

1. At the time of building plan review, the Fire Marshal will check for fire code compliance with the County Consolidated Fire Code, County Building Codes, and other applicable standards. Plans will be reviewed for elements including (but not limited to):
  - Class A roofing
  - Non-combustible exterior walls
  - Dual pane/tempered or tempered glazing
  - Vent restrictions
  - Eaves enclosed, not vented
  - Smoke detectors
  - Spark arresters
  - Deck restrictions

Additional requirements or modification of these requirements may result from more detailed review. Please call or email me if you have any questions or need clarification – (858) 495-5434 or [James.Pine@sdcounty.ca.gov](mailto:James.Pine@sdcounty.ca.gov).

Sincerely,



James Pine, Deputy Fire Marshal  
San Diego County Fire Authority  
Public Safety Group

# APPENDIX H

## OTAY MUNICIPAL WATER DISTRICT FORM 399-W



### County of San Diego, Planning & Development Services PROJECT FACILITY AVAILABILITY - WATER ZONING DIVISION

Please type or use pen		<b>W</b>
William Roetzheim Owner's Name _____ Phone _____ 13518 Jamul Drive Owner's Mailing Address _____ Street _____ Jamul CA 91935 City State Zip		ORG _____ ACCT _____ ACT _____ TASK _____ DATE _____
		AMT \$ <u>45.00</u> DISTRICT CASHIER'S USE ONLY

#### SECTION 1. PROJECT DESCRIPTION TO BE COMPLETED BY APPLICANT

A. ☐ Major Subdivision (TM) ☐ Specific Plan or Specific Plan Amendment  
☒ Minor Subdivision (TPM) ☐ Certificate of Compliance: \_\_\_\_\_  
☐ Boundary Adjustment  
☐ Rezone (Reclassification) from \_\_\_\_\_ to \_\_\_\_\_ zone.  
☐ Major Use Permit (MUP), purpose: \_\_\_\_\_  
☐ Time Extension... Case No. \_\_\_\_\_  
☐ Expired Map... Case No. \_\_\_\_\_  
☐ Other \_\_\_\_\_

B. ☒ Residential ..... Total number of dwelling units 4  
☐ Commercial ..... Gross floor area \_\_\_\_\_  
☐ Industrial ..... Gross floor area \_\_\_\_\_  
☐ Other ..... Gross floor area \_\_\_\_\_

C. ☐ Total Project acreage 10.5 Total number of lots 4

D. Is the project proposing the use of groundwater? ☒ Yes ☐ No  
 Is the project proposing the use of reclaimed water? ☐ Yes ☒ No

Assessor's Parcel Number(s)  
(Add extra if necessary)

596-152-04-00	

Thomas Guide Page 1273 Grid B-7  
 Jamul Highlands Road  
 Project address \_\_\_\_\_ Street \_\_\_\_\_  
 Jamul Delzura 91935  
 Community Planning Area/Subregion Zip

Owner/Applicant agrees to pay all necessary construction costs, dedicate all district required easements to extend service to the project and COMPLETE ALL CONDITIONS REQUIRED BY THE DISTRICT.

Applicant's Signature: [Signature] Date: 3/30/2017  
 Address: 13518 Jamul Drive, Jamul, CA 91935 Phone: 619-917-4917

(On completion of above, present to the district that provides water protection to complete Section 2 below.)

#### SECTION 2: FACILITY AVAILABILITY TO BE COMPLETED BY DISTRICT

District Name: OTAY WATER DISTRICT Service area: WATER I.D. 22

A. ☒ Project is in the district.  
☐ Project is not in the district but is within its Sphere of Influence boundary. owner must apply for annexation.  
☐ Project is not in the district and is not within its Sphere of Influence boundary.  
☐ The project is not located entirely within the district and a potential boundary issue exists with the \_\_\_\_\_ District.

B. ☒ Facilities to serve the project ☒ ARE ☐ ARE NOT reasonably expected to be available within the next 5 years based on the capital facility plans of the district. Explain in space below or on attached \_\_\_\_\_. (Number of sheets) \_\_\_\_\_  
☐ Project will not be served for the following reason(s): \_\_\_\_\_

C. ☐ District conditions are attached. Number of sheets attached: \_\_\_\_\_  
☐ District has specific water reclamation conditions which are attached. Number of sheets attached: \_\_\_\_\_  
☒ District will submit conditions at a later date.

D. ☐ How far will the pipeline(s) have to be extended to serve the project? Property front's water main on Jamul Highlands Rd.

This Project Facility Availability Form is valid until final discretionary action is taken pursuant to the application for the proposed project or until it is withdrawn, unless a shorter expiration date is otherwise noted.

Authorized Signature: [Signature] Print Name: WUTRAN  
 Print Title: WUTRAN - PERMIT TECH. Phone: 619-070-2243 Date: 4/11/17

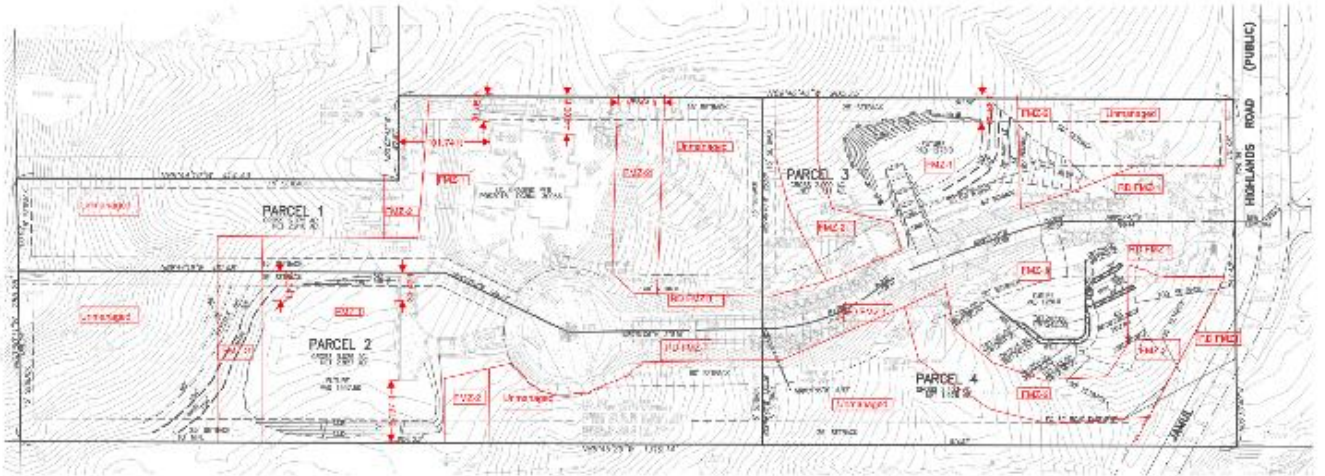
NOTE: THIS DOCUMENT IS NOT A COMMITMENT OF SERVICE OR FACILITIES BY THE DISTRICT  
 On completion of Section 2 and 3 by the District, applicant is to submit this form with application to:  
 Planning & Development Services - Zoning Counter, 5510 Overland Ave, Suite 110, San Diego, CA 92123



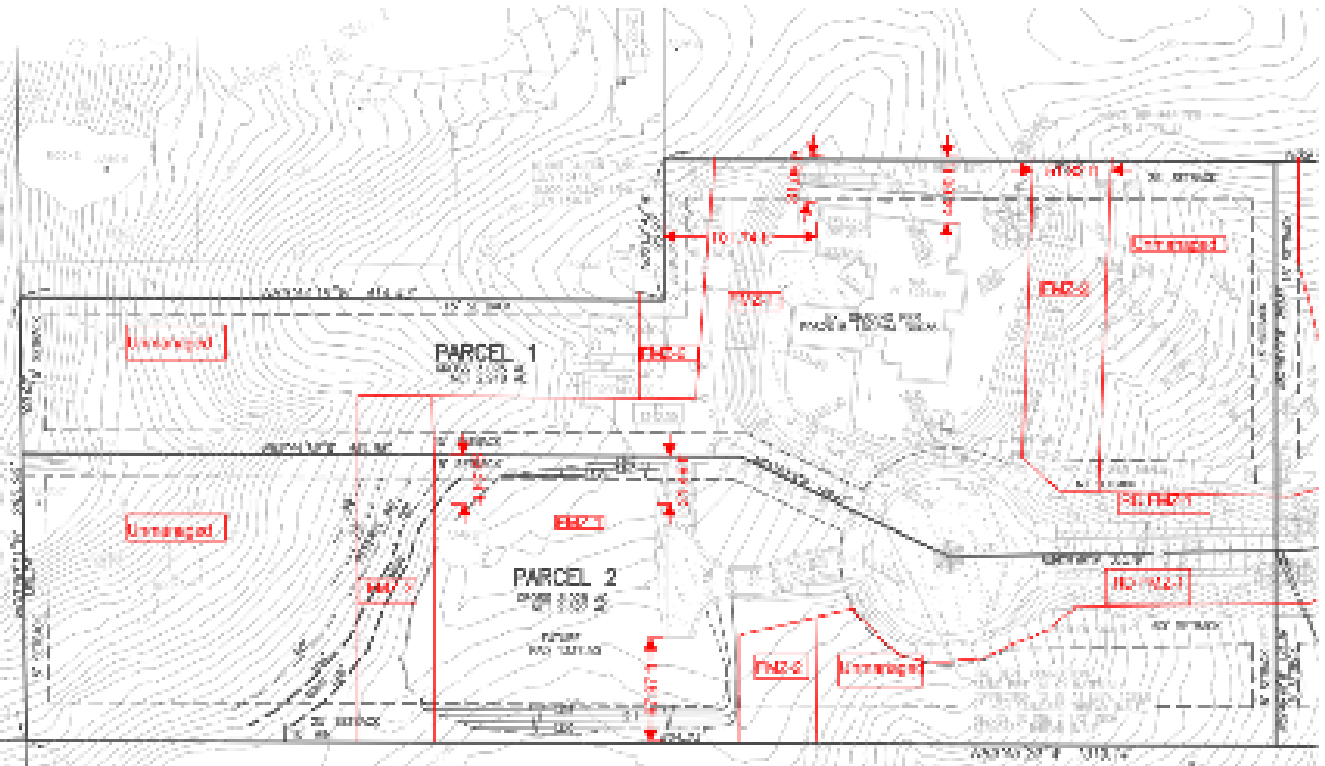
PDS-399W (Rev. 09/21/2012)

THIS APPROVAL OF AVAILABILITY  
SUBJECT TO ALL OTAY WATER DIST  
REQUIREMENTS IN EFFECT AT THE TIME  
APPLICATION FOR SERVICE.

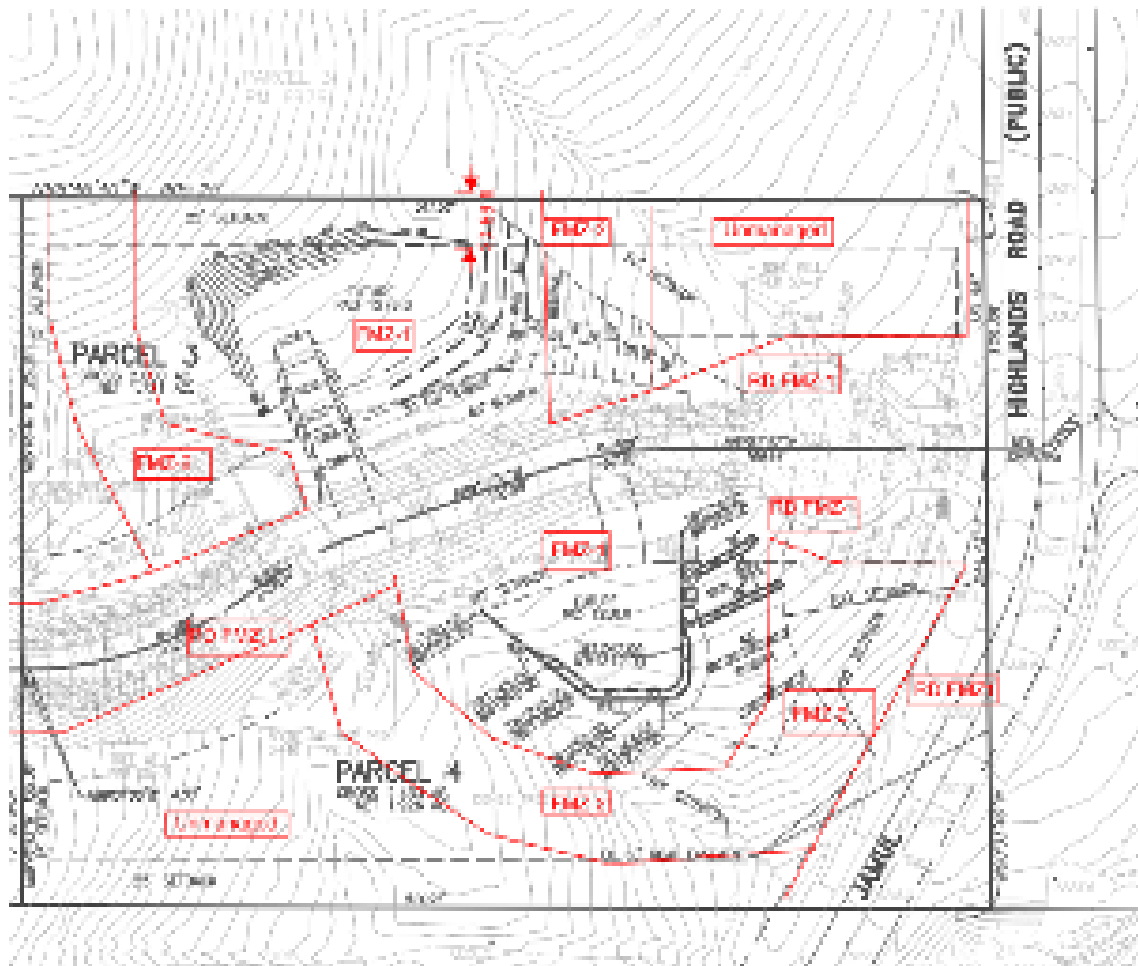
## APPENDIX I DEFENSIBLE SPACE MAPS



***Overall Project Defensible Space Map***



***West Project Zone Defensible Space Map***



*East Project Zone Defensible Space Map*

## REFERENCES

*Jamul Community Protection Plan*, March 2006

### **National Wildfire Coordinating Group Publications:**

*Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model*, General Technical Report RMRS-GTR-153. June 2005. Joe H. Scott, Robert E. Burgan, United States Department of Agriculture - Forest Service, Rocky Mountain Research Station, Missoula, Montana.

*BEHAVE PLUS: Fire Modeling System Version 5.0.3* April 5, 2010. Patricia L. Andrews, United States Department of Agriculture - Forest Service, Rocky Mountain Research Station – Fire Sciences Lab, Missoula, Montana and Collin D. Bevins, System for Environmental Management, PO Box 8868, Missoula, Montana, 59807. Web site: <http://fire.org/>

*National Wildfire Coordinating Group - S-290 Intermediate Fire Behavior Manual*

*National Wildfire Coordinating Group – S-390 Introduction to Wildfire Calculations Manual*

*National Wildfire Coordinating Group – S-490 Wildfire Calculations Manual*

*Aids to Determining Fuel Models for Estimating Fire Behavior*, Hal E. Anderson, United States Department of Agriculture Forest Service Intermountain Forest and Range Experiment Station General Technical Report INT-122, April 1982

*Physics-Based Modeling for WUI Fire Spread – Simplified Model Algorithm for Ignition of Structures by Burning Vegetation*, USDA Fire Research Division, NISTIR 7179

### **NFPA Publications:**

National Fire Protection Association - NFPA 13-D, *Standard for the Installation of Sprinkler Systems in One – and Two-Family Dwellings and Manufactured Homes*, 2010 and 2013 Editions.

National Fire Protection Association - NFPA 1142 *Standard on Water Supplies for Suburban and Rural Fire Fighting*, 2012 Edition.

National Fire Protection Association - NFPA 1144 *Standard for Reducing Structure Ignition Hazards from Wildfire* (2008).



National Fire Protection Association - NFPA 1142, 2008 Edition. Table C.11 (b) Time-Distance Table Using an Average Speed of 35 mph.

National Fire Protection Association Pamphlet 299 *Protection of Life and Property from Wildfire*

## **State of California Regulatory Documents**

California Code of Regulations, Title 14, section 1280 and Title 24 Part 9

California Public Resources Codes sections 4201 through 4291

California Government Code, sections 51175 through 51189.

2016 California Fire Code, CCR Title 24 Part 9

California Code of Regulations, Title 24, Part 2 - 2016 *California Building Code*

## **Other Documents**

National Fire Academy *Fire Dynamics Course Guide*; FEMA May 1999

*An Introduction to Fire Dynamics*, Third Edition; Douglas Drysdale, 2011

*Fundamentals of Engineering Thermodynamics* 8<sup>th</sup> Edition, Moran, 2014

*Fire, Chaparral and Survival in Southern California*, Richard W. Halsey, 2005

*SFPE Handbook of Fire Protection Engineering*, 5<sup>th</sup> Edition, 2016

*Structural Design for Fire Safety* Second Edition, Buchanan & Abu, 2017

*An Analysis of Large Chaparral Fires in San Diego County, California*, Bob Eisele, USDA Forest Service Proceedings RMRS-P-73 2015

*National Wildfire Investigation Training Program*, Federal Law Enforcement Training Center, 2002

## **Maps**

*Vegetation in San Diego County Map*, County of San Diego Department of Planning and Land Use, GIS Division, June 2008

*San Diego County Fire Hazard Severity Zones in SRA*, CALFIRE Fire Resource and Assessment Program, November 2007

*California State and Local Responsibility Area Fire Hazard Severity Zone Map.*